i8094A & i-8094H 快速上手手冊

(Version 1.3)

PAC WinCon-8000 系列控制器

(適用於 i8094A & i8094H)



ICP DAS CO., LTD.

泓格科技股份有限公司

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目錄

1 i8094A/i8094H 運動控制器模組簡介

1.1 i8094A/i8094H 簡介

i8094A/i8094H 是一內鍵有 CPU、DPRAM、FRAM 及 SRAM 的整合性軸控模組且支援 4 軸步進/伺服馬達運動控制模組，輸出 Pulse 可高達 4M PPS，配合泓格公司的控制器 WinCon-8000 上。i8094A/i8094H 運動控制模組適合一般運動控制應用，提供非常多的運動控制功能讓客戶使用，例如 2/3 軸直線補間、2 軸圓(弧)補間、T/S 加減速曲線、多軸組合的同步運動、可規劃的自動歸原點等等，此外,i8094H 更內鍵了泓格公司特有的 FRnet 分散式 DI 及 DO 控制功能,可以外接控制 128DI 及 128DO 點,且每次週期時間為 0.74ms.而 i8094A/i8094H 在執行上述功能時,並不需耗用 WinCon 系統資源,CPU 可同時監控其他執行狀態，由於只耗用少量系統資源，因此可以在 WinCon-8000 插上多個 i8094A/i8094H 模組，以多軸(4、8….)運動控制於同一控制器上；另外，此模組因具有內鍵 CPU 等硬體設計，所以更支援了一系列的巨集程式功能，可以提供客戶規劃多組的巨集程式內容，應用於程式開發時將可減少程式內容，使程式設計者在程式設計可以更靈活。泓格亦提供相當多的範例程式及巨集功能，以減少程式設計的工時，符合低成本高效能的運動控制系統設計平台。

1.2 硬體規格

1.2.1 主要規格

■ 控制晶片	MCX314As
■ CPU	80186
■ FRAM	128KB
■ SRAM	512KB
■ EEPROM	512KB
■ 控制軸數	4 軸,脈波式輸出(步進或伺服馬達)
■ 最大輸出脈波速度	4 M PPS

1.2.2 補間功能

2-軸 / 3-軸 直線補間

■ 每一軸補間區間	−2,147,483,646 ~ +2,147,483,646
■ 補間向量速度	1 PPS ~ 4 M PPS
■ 補間精度	± 0.5 LSB

圓弧補間

■ 每一軸補間區間	−2,147,483,646 ~ +2,147,483,646
■ 補間向量速度	1 PPS ~ 4 M PPS

相關補間功能

- ■ 可以選擇任意軸補間
- ■ 固定向量速度
- ■ 可連續補間

1.2.3 輸出脈衝

■ 脈衝輸出速度範圍	1 PPS ~ 4 MPPS
■ 脈衝輸出精度	± 0.1%
■ S-曲線衝量(Jerk) 範圍	954 ~ 62.5 x 10^6 PPS/S^2 477 x 10^3 ~ 31.25 x 10^9 PPS/S^2
■ 加減速範圍	125 ~ 1 x 10^6 PPS/S 62.5×10^3 ~ 500 x 10^6 PPS/S
■ 速度精度	1 PPS 到 500PPS(依最高速而定)
■ 脈衝輸出數	0 ~ 4,294,967,295 / unlimited

- ■ 速度曲線型態:
  - ◆ 定速
  - ◆ 對稱與非對稱線性加減速
  - ◆ 對稱與非對稱S型加減速

- ■ 減速度模式
  - ◆ 自動(對稱線性加減速) Auto
  - ◆ 自訂

- ■ 於驅動中途可以動態改變速度及脈波數
- ■ 定數脈波輸出可以用 T/S-曲線加減速
- ■ 可選脈波輸出為CW/CCW 或 PULSE/DIR 方式
- ■ 可以選擇邏輯準位

1.2.4 編碼器輸入

- ■ 可選擇 A/B 相脈衝輸入或 Up/Down 脈衝輸入
- ■ 可選擇 1、2 及 4 除頻 (A/B 相脈衝輸入)

1.2.5 位置計數器

■ 指令位置計數器範圍	−2,147,483,648 ~ +2,147,483,647
■ 實際位置(編碼器輸入)計數器範圍	−2,147,483,648 ~ +2,147,483,647

- 可設定為環狀計數器功能(圓位置)
- 編碼器輸入可設定反方向
- 實際位置可利用DI(IN3)輸入清除為零
- 位置計數器可以讀取，也可以設定

1.2.6 自動歸原點

- 自動歸原點步驟
  - 步驟 1 (高速找 ”近原點” 感測器)
  - 步驟 2 (低速找 ”原點” 感測器)
  - 步驟 3 (低速找伺服馬達Z相感測器)
  - 步驟 4 (高速到補正值位置)

每一步驟都可設定要不要執行及其找尋方向

1.2.7 伺服馬達輸入訊號 Servo Motor Input Signal

- 警告 (Alarm)
- 可選擇伺服到位(In Position Check) 或 伺服就序(Servo Ready)
- 可以選擇 有效/無效 及 邏輯準位

1.2.8 極限訊號輸入

- 各軸 2 個極限訊號輸入+ 極限, − 極限
- 可以選擇 邏輯準位 及碰觸極限後可 減速停或急停

1.2.9 其它輸入訊號 Other Input Signals

- 各軸 IN3 可以用來做其他用途，如同期控制中之輸入事件

1.2.10 緊急停止訊號輸入, Emergency Stop Signal Input

- 每一模組提供一個緊急停止信號輸入

1.2.11 一般輸出訊號 General Output Signal

- 各軸 nOUT1 作為控制Servo On/Off 信號

1.2.12 整合輸入濾波器 Contents of integral type filters

- 對模組中一般DI輸入信號可以設定雜訊數位濾波(時間參數)功能

1.2.13 軟體極限

- 各軸可支援 2 個軟體極限 + 極限, − 極限 (−2,147,483,646 ~ +2,147,483,646)

1.2.14 手動外部輸入信號驅動

- 固定Pulse數驅動(Fixed Pulse Driving Mode)
- 連續Pulse驅動(Continuous Pulse Driving Mode)
- 手輪Pulse驅動(Manual pulsar mode)

1.2.15 模組狀態顯示 LED

- 紅燈 → 電源指示燈
- 橘燈 → Servo Alarm 指示燈 (驅動器輸出ON橘燈亮)
  例:三菱驅動器故障(ALM)，無異警時輸出ON，橘燈亮
- 綠燈 → Motion 動作指示燈

1.2.16 Compare Trigger Output

- 僅支援X軸及Y軸
- 輸出方式 5V TTL

1.2.17 FRnet 分散式 DI/O (i8094H 專用功能)

- DI → 128 點
- DO → 128 點
- 可搭配 FRnet I/O 模組動態增減點數

1.3 環境參數 Environment

- 工作溫度 -20 ~ + 75°C
- 儲存溫度 -30 ~ +85°C
- 工作濕度 10 ~ 85%，非結露non-condensing
- 儲存濕度 5 ~ 90%，非結露non-condensing
- I/O 信號隔離 2500Vrms
- 外部供給電壓 24V DC (接線子板)

1.4 採購資訊 Ordering Information

- **W-8000** 嵌入式控制器系列主機(請洽相關業務單位)
- **i8094A/i8094H** 4軸運動控制器模組
- **DN-8468GB** i8094A/i8094H 端子板
- **DN-8468DB** i8094A/i8094H 端子板
- **DN-8468MB** i8094A/i8094H 端子板
- **DN-8468PB** i8094A/i8094H 端子板
- **DN-8468YB** i8094A/i8094H 端子板
- **CA-SCSI15** 68-pin SCSI-II 接頭線，長度:1.5 m
- **CA-SCSI30** 68-pin SCSI-II 接頭線，長度:3 m
- **CA-SCSI50** 68-pin SCSI-II 接頭線，長度:5 m

2 硬體接線

2.1 i8094A/i8094H 檢查包裝,及安裝

2.1.1 檢查包裝

i8094A/i8094H 是一個整合性的 4 軸 步進/伺服 馬達運動控制模組，配合泓格公司 WinCon-8000、嵌入式控制器系列主機使用，基本上須配和如下主機產品

- W-8000 嵌入式PAC控制器系列主機

i8094A/i8094H 需用之產品

- i8094A/i8094H　整合性4軸運動控制器模組
- DN-8468系列　i8094A/i8094H 配線端子板
- CA-SCSI15　68-pin SCSI-II 接頭線，長度:1.5 m

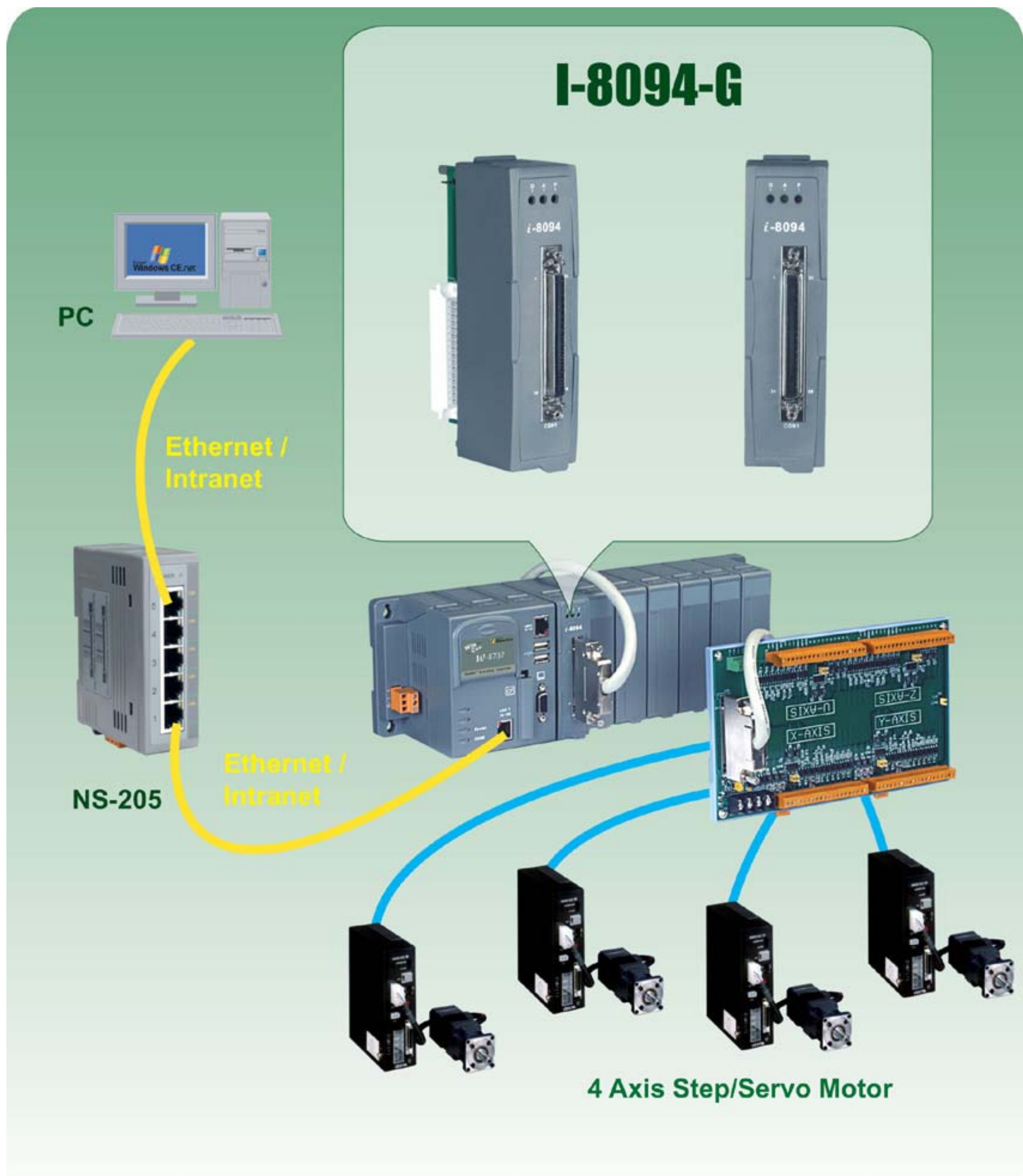
2.1.2 i8094A/i8094H 安裝

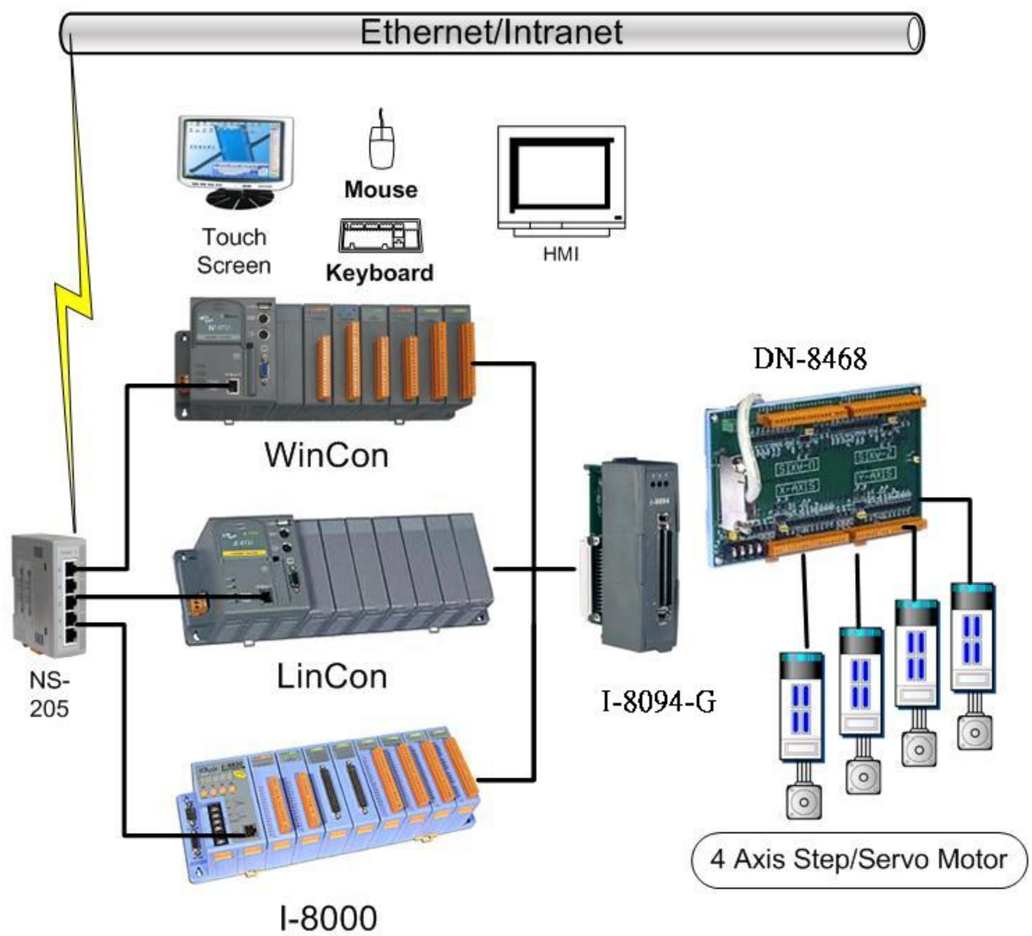
準備控制器

W-8000、嵌入式控制器系列主機(擇其一),並選用有空 IO 插槽之型號,請先將電源關閉。

插入模組,及連接線

選一嵌入式控制器空IO插槽，將i8094A/i8094H小心依導槽插入W-8000 嵌入式控制器,並用CA-SCSI15聯接到 DN-8468配線端子板，如下圖:


I-8094-G
PC
Ethernet / Intranet
NS-205
Ethernet / Intranet
4 Axis Step/Servo Motor



i8094A/i8094H 與控制器規劃圖 (WinCon-8000、LinCon-8000、I-8000)

2.2 DN-8468GB 端子板

2.2.1 DN-8468GB 外觀尺寸圖

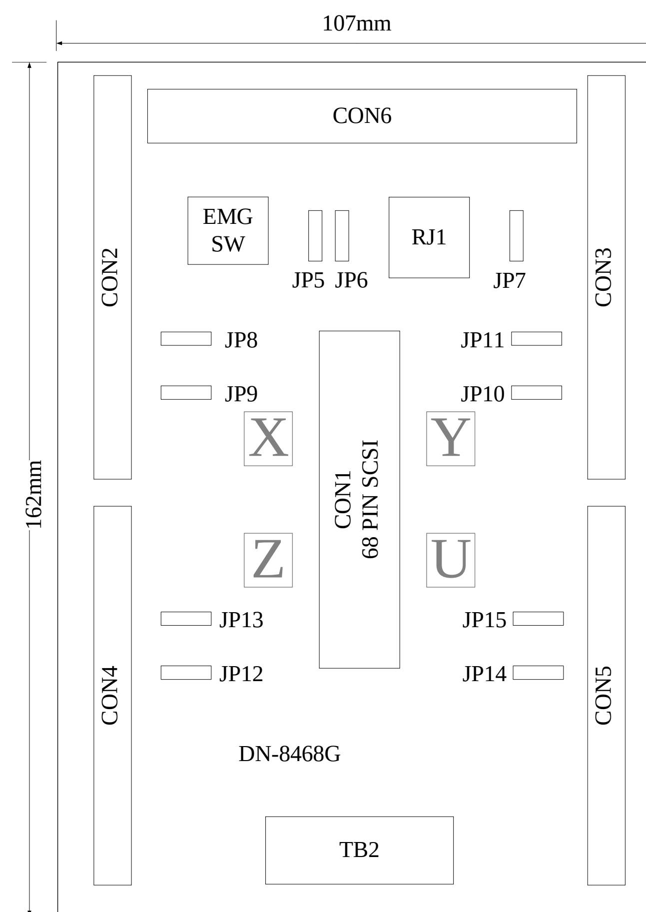


Fig. 2.0 DN-8468G外觀尺寸圖

2.2.2 腳位定義

■ **CON1**

68-pin 的 **SCSI II** 接腳定義, 主要是連結控制模組及配線端子台的接頭.

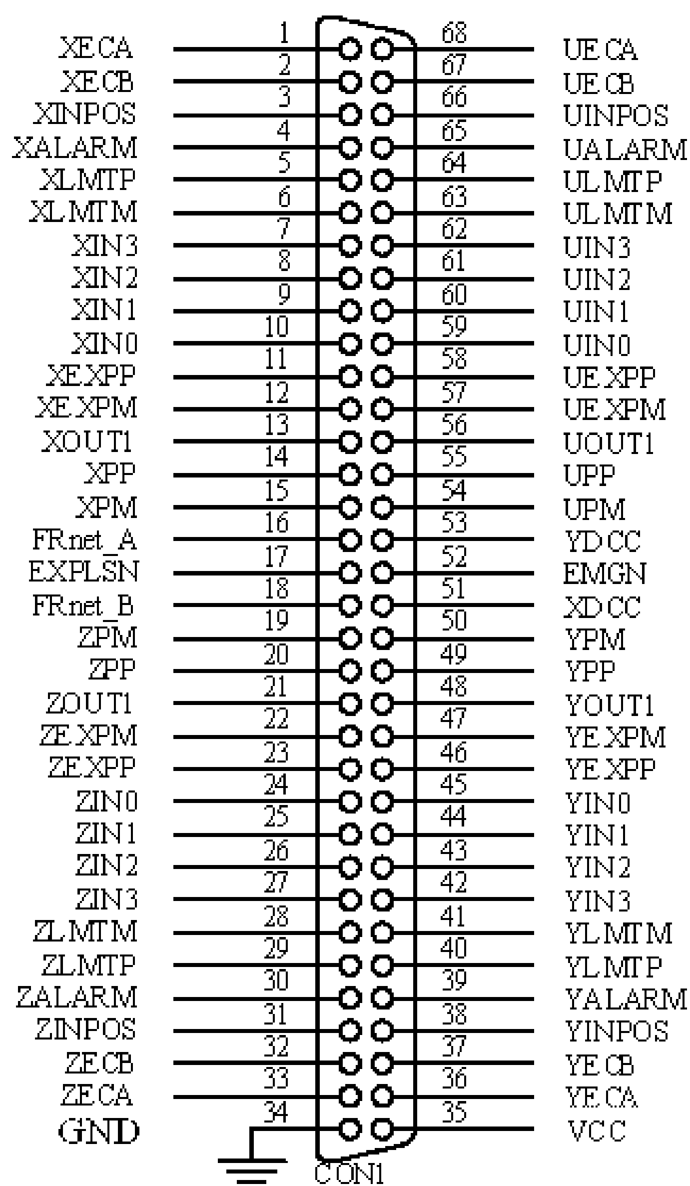


Fig. 2.1 CON1 連接線 **I/O** 腳位圖

Table 2.1 DN-8468G 連接線 **I/O** 腳位說明(part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 2.2 DN-8468G 連接線 **I/O** 腳位說明(part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FrnetA	16	FRnet port A
FrnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ **CON2 ~ CON5: X、Y、Z、U 軸 I/O 信號接線內容說明**

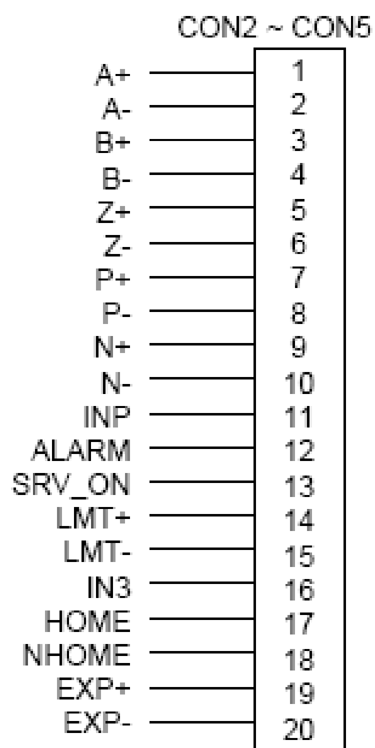


Fig. 2.2 Pin definition for CON2 ~ CON5

Table 2.3 CON2 ~ CON5 Signal Connection

Name	Number	Description
A+	1	Encoder A-Phase (+)
A-	2	Encoder A-Phase (-)
B+	3	Encoder B-Phase (+)
B-	4	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	6	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	9	Negative Direction Pulse Output(+)
N-	10	Negative Direction Pulse Output(-)
INP	11	Servo In Position
ALARM	12	Servo Alarm
SRV_ON	13	Servo On
LMT+	14	END Limit Signal (EL+)
LMT-	15	END Limit Signal (EL-)
IN3	16	Input Signal (IN3)
HOME	17	Home Sensor Input Signal
NHOME	18	Near Home Sensor Input Signal
EXP+	19	EXT Positive Direction Pulse (+)
EXP-	20	EXT Negative Direction Pulse (-)

■ **CON6:**是一個 16 Pin 的接頭,主要是提供使用者可以外接馬達 RDY 及 EMG 訊號,外部 Pulse 輸入,FRnet 的接點(僅 i8094H 有此功能),讓使用者可以和外部的 DI/DO 模組連接…等等; **FRnet(i8094HF) 接線可以連接 FRnet 系列 IO 模組如 FR-2053,FR-2057....詳情請參考泓格網站:http://www.icpdas.com/products/Remote_IO/frnet/frnet_introduction.htm**

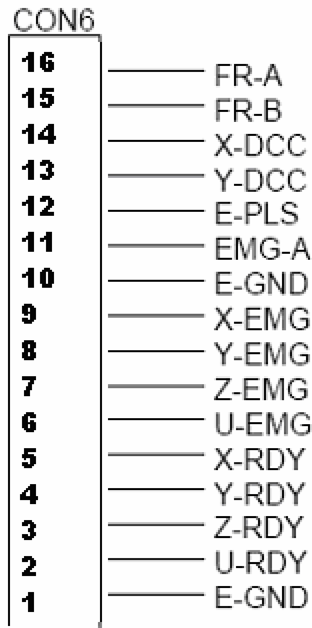


Fig. 2-3 Pin definition for CON6

Table 2-4 CON6 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground
X-EMG	EMG input signal for X axis
Y-EMG	EMG input signal for Y axis
Z-EMG	EMG input signal for Z axis
U-EMG	EMG input signal for U axis
X-RDY	Ready input signal for X axis
Y-RDY	Ready input signal for Y axis
Z-RDY	Ready input signal for Z axis
U-RDY	Ready input signal for U axis

■ **TB2:**外部電源輸入接點

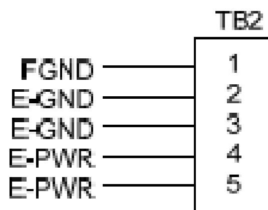


Fig. 2.4 Pin definition for TB2

Table 2.5 TB2 Signal Connection

Name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Note: Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happen

■ **RJ1 (The I/O signals of the FRnet):為 FRnet 的接點,是一 8-pin RJ45 接口**

FRnet(i8094HF) 接線可以連接 FRnet 系列 IO 模組如 FR-2053,FR-2057….詳情請參考泓格網站:http://www.icpdas.com/products/Remote_IO/frnet/frnet_introduction.htm

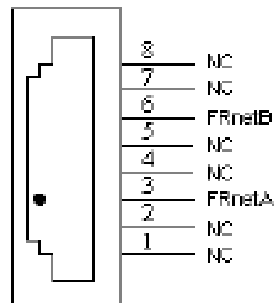


Fig. 2.5 Pin definition for RJ1

Table 2.6 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Note: Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

2.2.3 功能選擇(跨接器設定)

■ **JP7:**設定 **CON6** 的 **EMG-A** 訊號功能使用與否

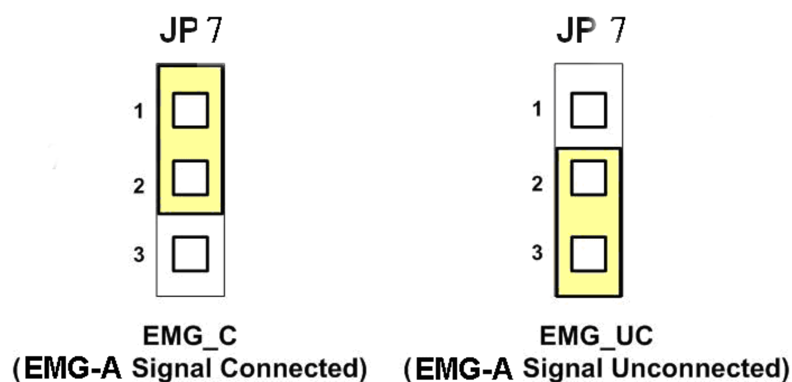


Fig. 2.6 Jumper 7 setting

■ **JP8/9, JP10/11, JP12/13, JP14/15:**設定各軸的 Pulse 訊號模式為差動輸出(2 & 3 腳位短路)或者是開集極方式輸出(1 & 2 腳位短路).

note: Open Collector output，P+ (N+) and EXT_5V short，offer external usage (Refer to section 2.3)。

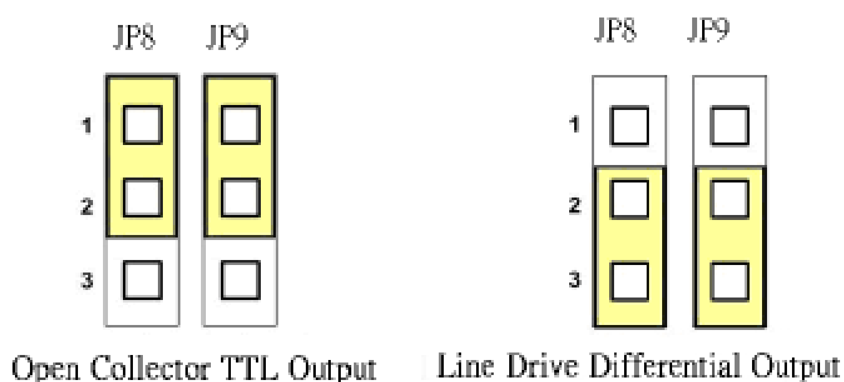


Fig. 2.10 Jumper 8, 9 setting

■ **EMG SW:設定各軸馬達的 EMG 訊號為直接連接到 GND 或者是使用者結合 CON6 的接點自行連接制.**

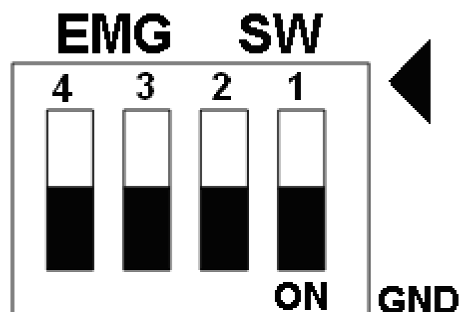


Fig. 2.7　EMG SW setting for normally GND　(Default setting)

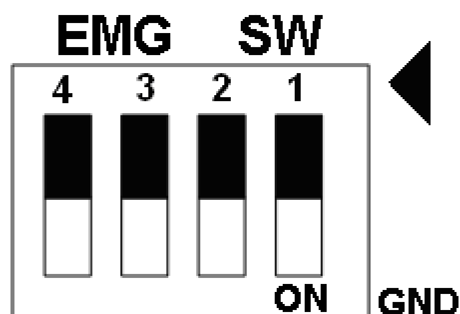


Fig. 2.8　EMG SW setting for user controlled signals.

2.3 I/O 輸出入介面

2.3.1 脈波輸出介面

差動脈波輸出接線

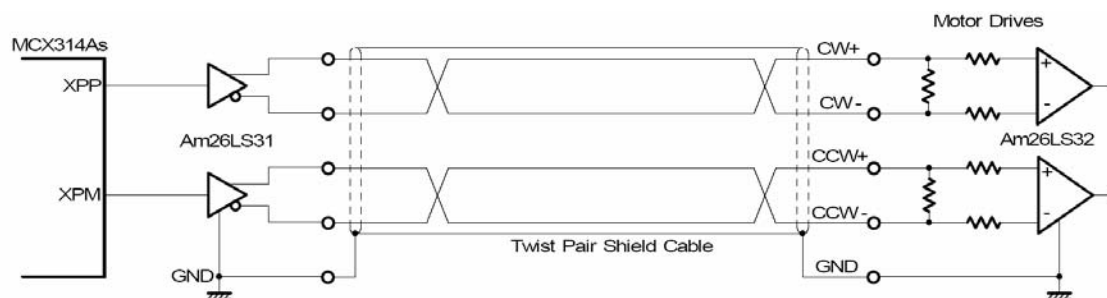


Fig. 2.8 差動脈波輸出接線

開集極輸出

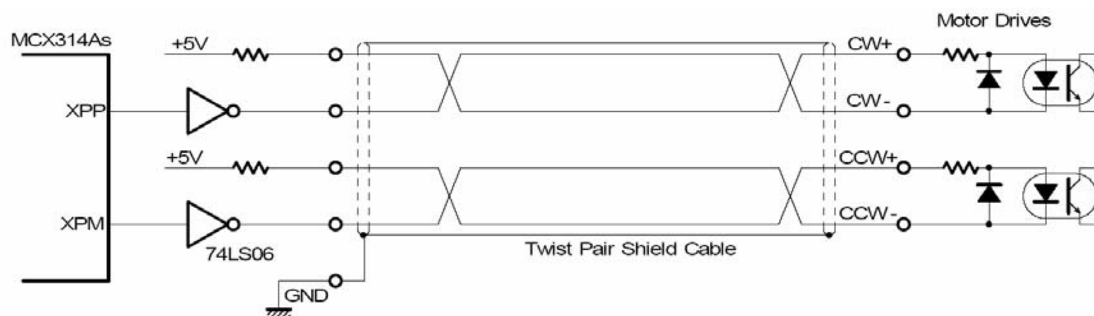


Fig. 2.9 開集極輸出

脈波信號接線範例

I8094A/I8094H 脈波輸出命令，可以使用 **CW/CCW** 模式或用 **PULSE/DIR** 模式。利用 **JP2** 和 **JP3** 去選擇差動或開集極的接法。

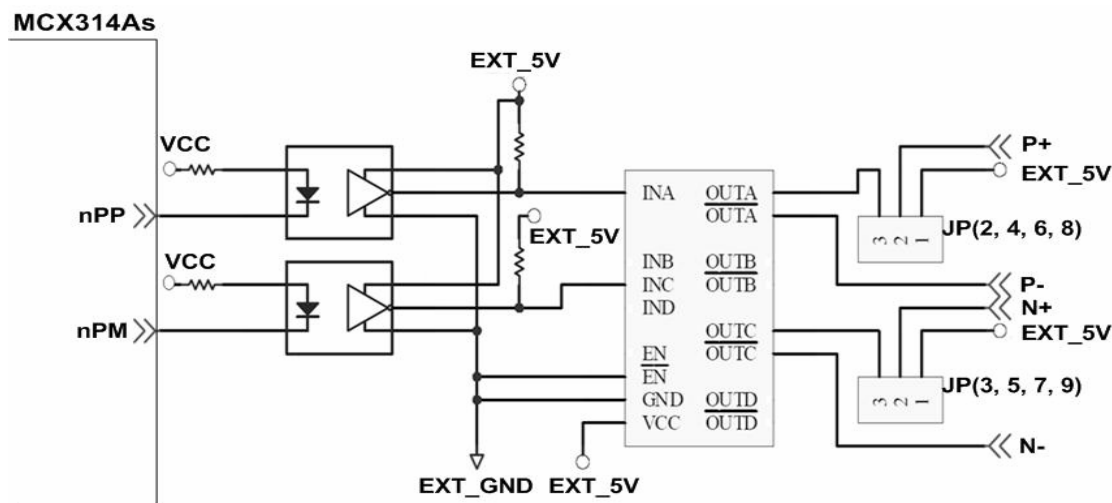


Fig. 2.10 脈波信號接線範例

2.3.2 極限開關接線(Connection for Limit switch Signal)

使用極限開關去防止機械過動作，設計者能透過本手冊的函式庫，去設定硬體極限開關的動作等級。下面圖例，極限開關信號的接續迴路是為了要隔離雜訊源。

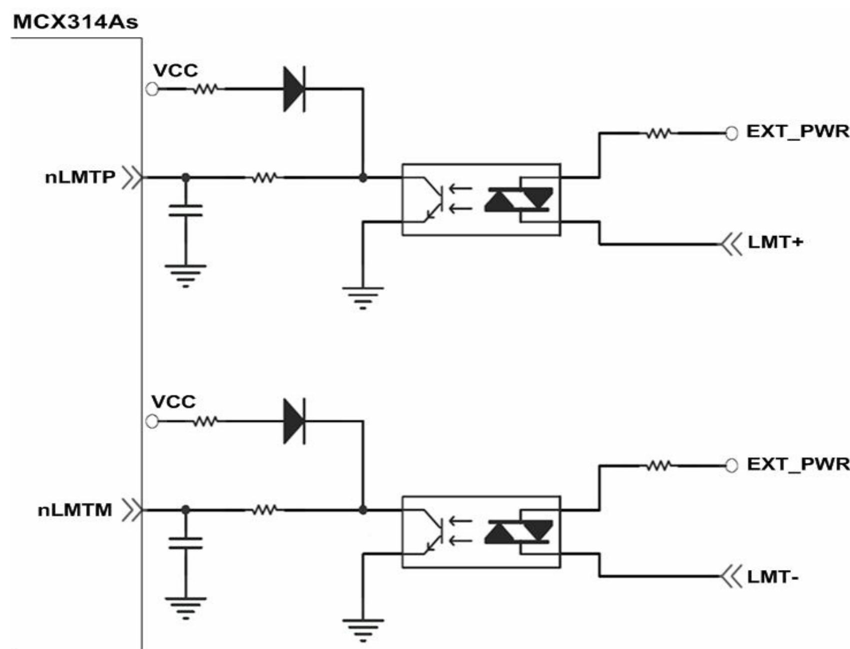


Fig. 2.11 極限開關接線範例

2.3.3 一般 DI 輸入接線(nINPOS,nALARM)

nINPOS 輸入信號，是伺服驅動器 **in-Position** 的檢查信號。設計者能透過本手冊的函式庫去 **enable/disable** 這個信號。

nALARM 輸入信號，是伺服驅動器警報輸出信號，當 **I8094A/I8094H** 收到這個信號可以停止輸出脈波。設計者能透過本手冊的函式庫去 **enable/disable** 這個信號。

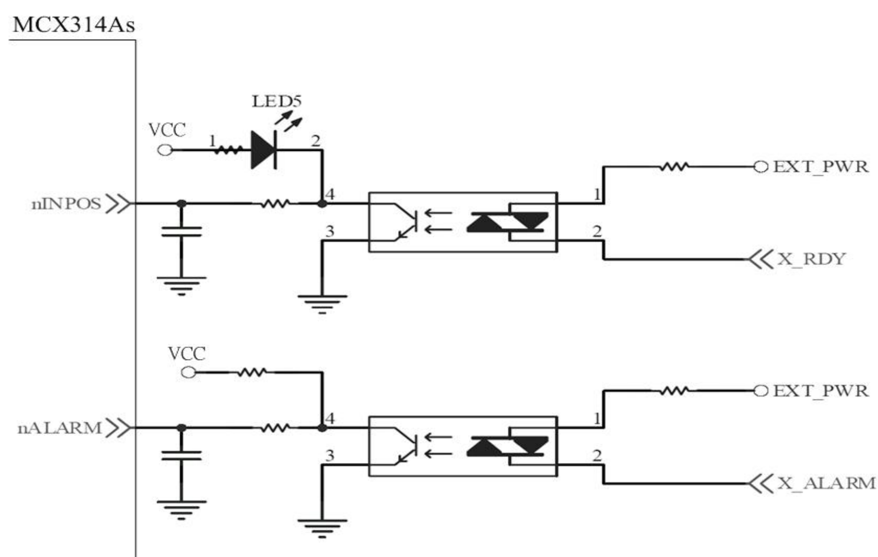


Fig. 2.12 一般 DI 輸入接線範例

2.3.4 Encoder 輸入接線(Encoder Signals)

下圖是一個 Encoder 輸入接線範例，是用差動輸入信號接法。要接 Encoder 輸入時，A 相請連接 A+、A-，B 相請連接 B+、B-,經過高速光偶合 IC 就直接連到運動控制晶片。

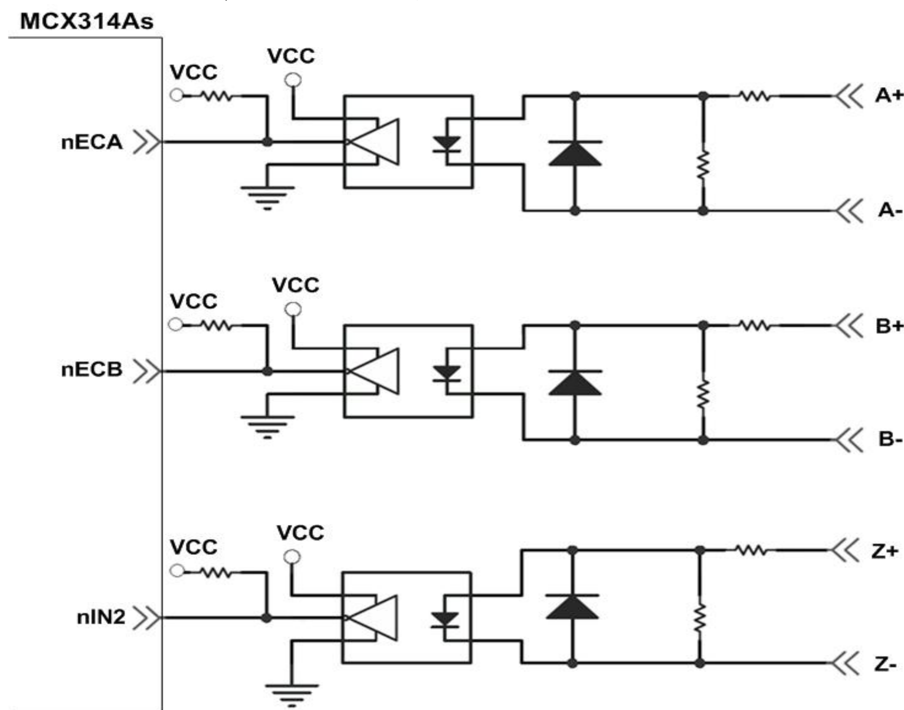


Fig. 2.13 Encoder 接線範例

2.3.5 外部輸入脈波接線(external pulse signal)

下圖是一個外部輸入脈波接線範例，經過高速光偶合 IC 就直接連到運動控制晶片。

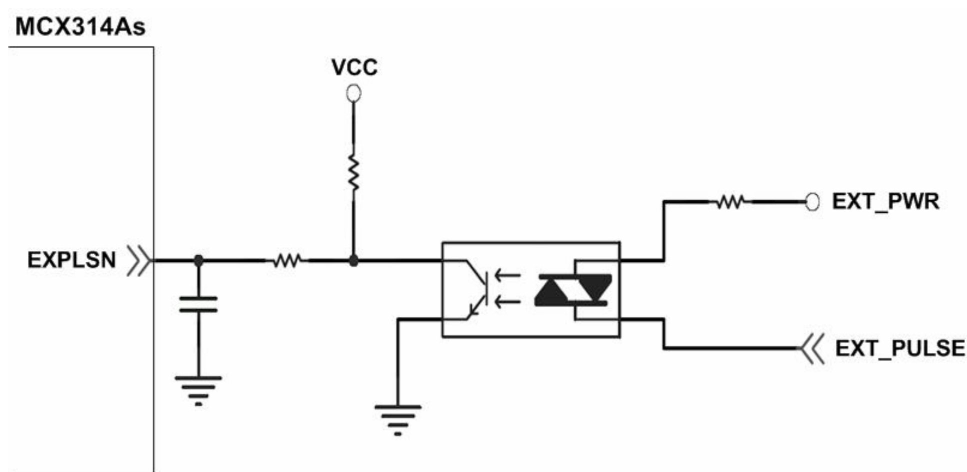


Fig. 2.14 外部輸入脈波接線範例

2.3.6 緊急停止輸入接線(emergency stop signal)

下圖是一個緊急停止輸入接線範例，當緊急停止輸入被按下時，所有軸會立即停止輸出，錯誤旗標將設為 1，這信號經過高速光偶合 IC 就直接連到運動控制晶片。

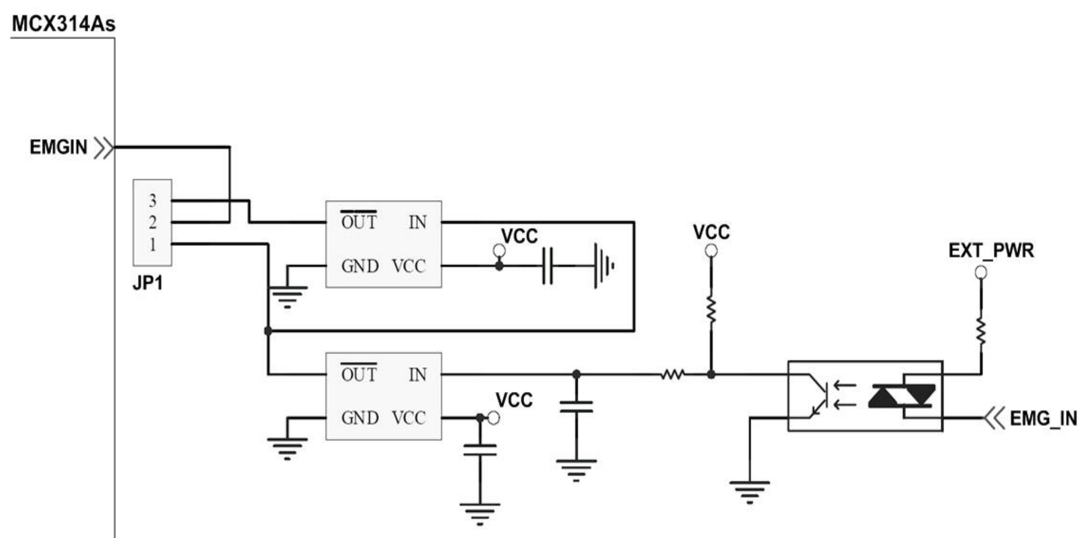


Fig. 2.15 緊急停止輸入接線範例

2.3.7 外部信號輸入接線(EXP+,EXP-)

本信號用於外部輸入驅動，下圖是外部信號 **+/-** 輸入接線範例，這輸入功能可用 **5.1** 章節中的固定脈波驅動、連續脈波驅動、手輪脈波驅動三個功能可以應用。

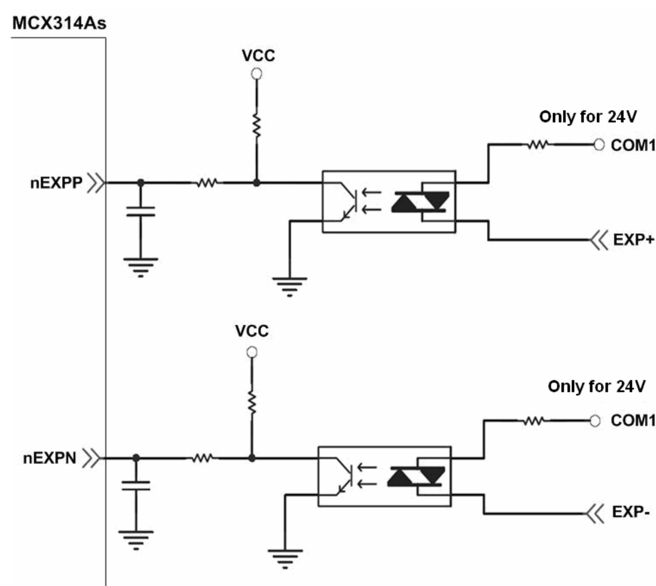


Fig. 2.16 外部信號 **+/-** 輸入接線範例

2.3.8 Servo On/Off 信號輸出接線(ENABLE)

下圖是 **Servo On/Off** 信號輸出接線範例，這輸出功能用於使每軸伺服馬達伺服啟動/關閉。

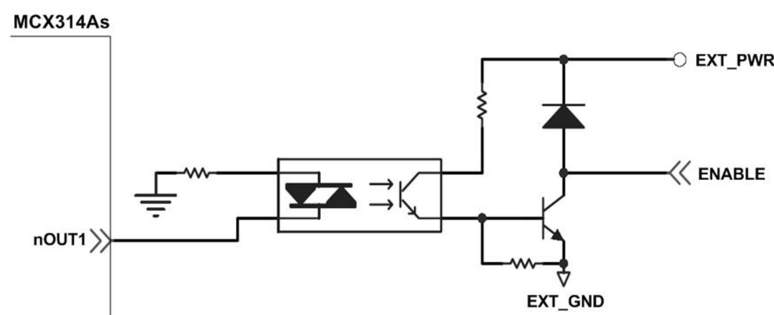


Fig. 2.17 Servo On/Off 信號輸出接線

2.3.9 Compare Trigger Output 信號輸出接線

下圖是 **Trigger Out** 信號輸出接線範例,此一輸出功能僅支援 **X** 軸及 **Y** 軸的 **Compare Trigger Output** 使客戶可以結合特殊應用，如截取影像等.

2.4 接線範例

我們實際示範接 **MITSUBISH MR-J2S AC** 伺服馬達，連接到 **DN-8468GB** 的接線腳位圖

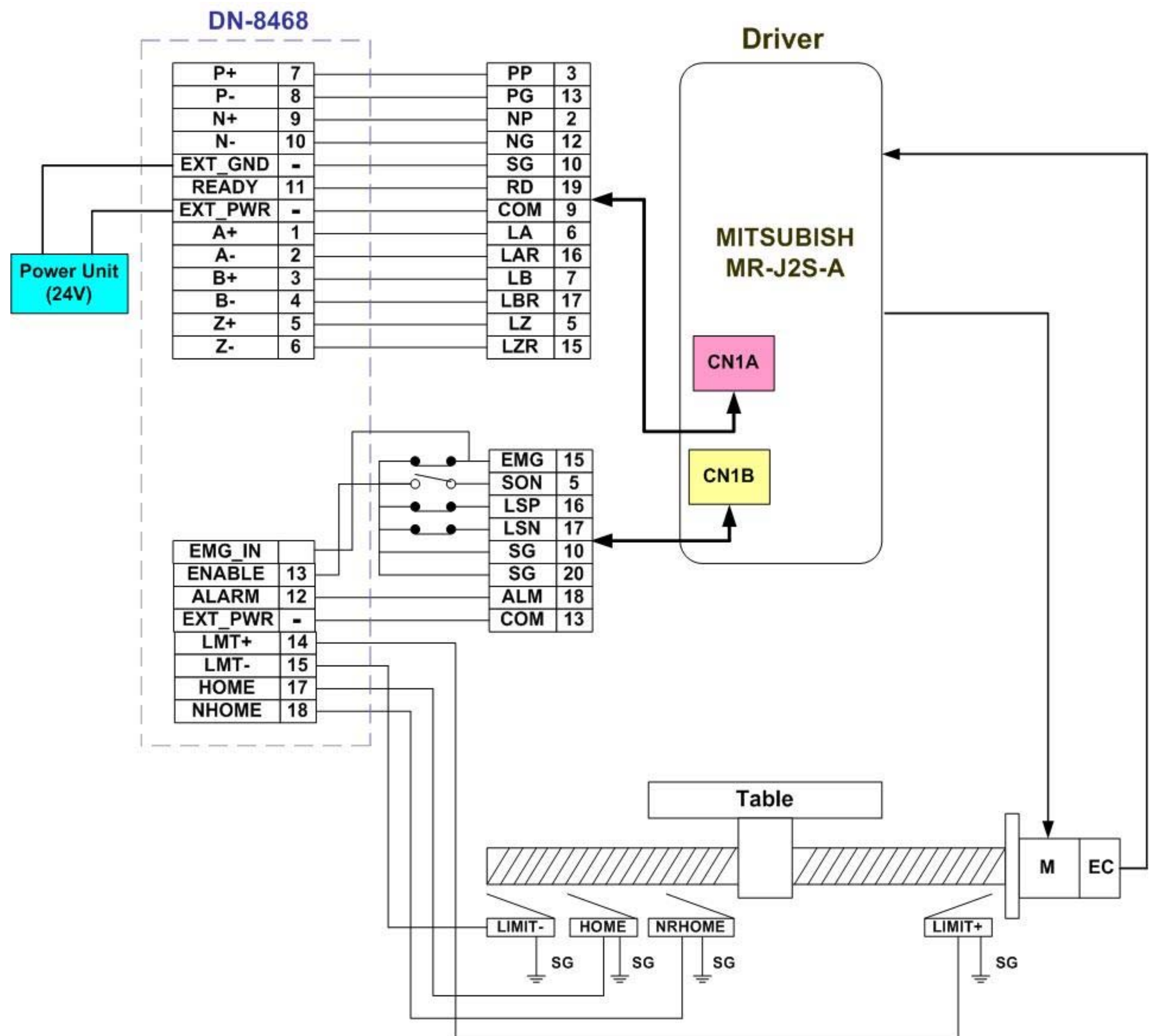
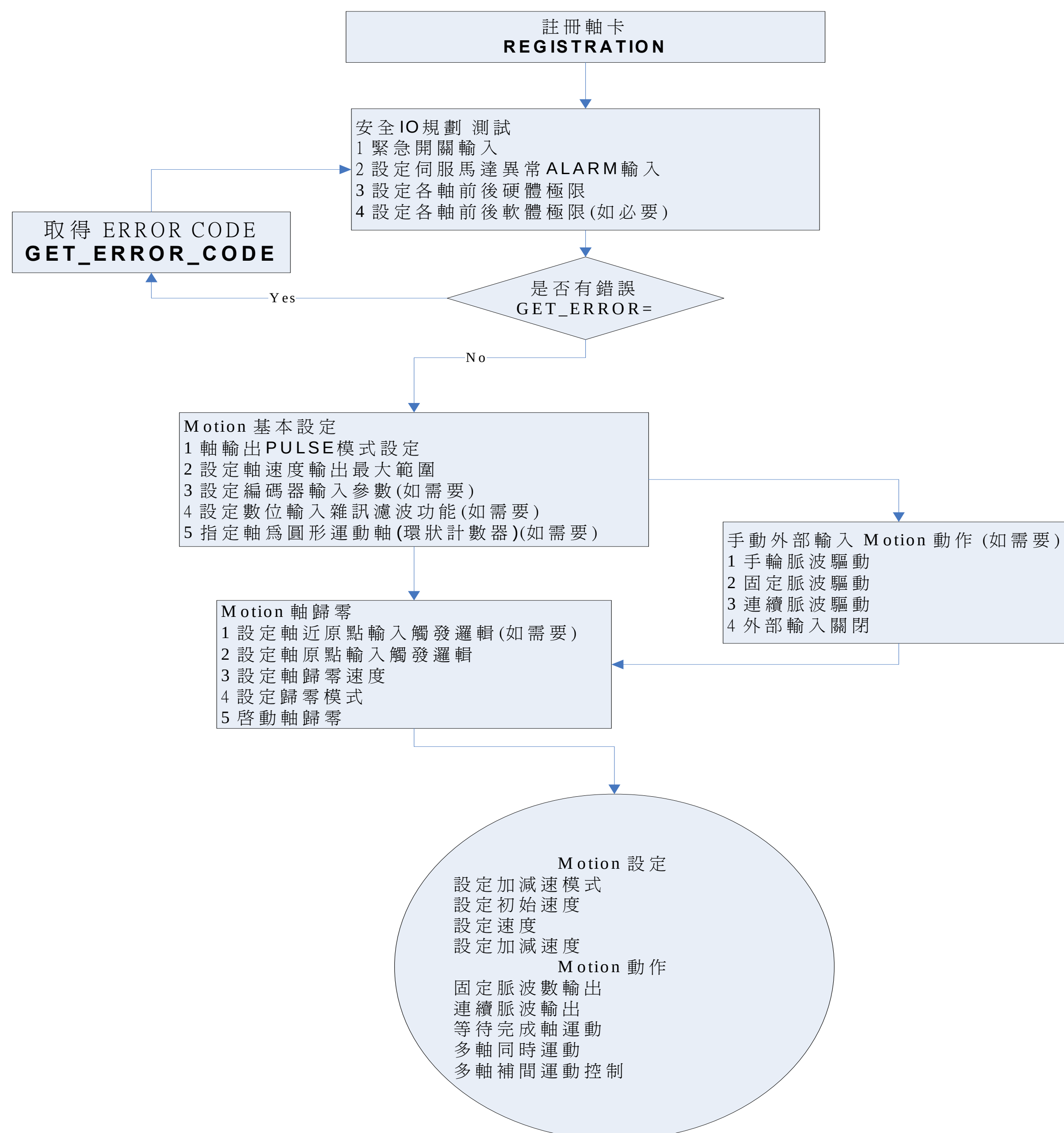


Fig. 2.18 MR-J2S AC 伺服馬達，連接到 **DN-8468GB** 的接線腳位圖

3 i8094A/i8094H 軟體開發程序

3.1 軟體開發測試程序概觀

詳細請參考"i8094H_start"範例程式



3.1.1 註冊軸卡

每一軸卡要使用之前一定要先註冊，才能下其他指令，否則會產生錯誤。
請參考 "i8094H_Manual_1.3tc.pdf 章節 2.2" i8094H_REGISTRATION()。

3.2 安全 IO 規劃(會使 Motion 不動作原因)

3.2.1 緊急開關輸入

緊急開關，是為因應緊急狀況，讓使用者在緊急時可以立即使**Motion** 動作停止，以保護人機安全。

如果您不用緊急開關，在 **1.2.3** 的**JP1**接為**2-3pin**。

如果您要使用緊急開關，在 **1.2.3** 的**JP1**接為**1-2pin**，**EMG_IN** 請連到常閉型**(N.C.)**開關，並將開關安裝到適當位置。

3.2.2 設定伺服馬達異常 ALARM 輸入參數

是為因應伺服馬達**ALARM**發生時輸入，讓使用者可以判斷及處理，您可以選擇使用與否，與適當觸發邏輯。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.13" i8094H_SET_ALARM()**。

3.2.3 設定各軸前後硬體極限

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關，讓使用者可以避免超出行程，如碰觸到前後硬體極限開關**I8094A/I8094H**會自動停止，您可以選擇使用適當觸發邏輯。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.6" i8094H_SET_HLMT()**。

3.2.4 設定各軸前後軟體極限

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關外，可以再加軟體極限，讓使用者可以提早避免超出行程，或免用硬體極限，如碰觸到前後軟體極限**I8094A/I8094H**會自動停止，您可以選擇使用與否，與設定位置。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.10" i8094H_SET_SLMT()**。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.10"i8094H_CLEAR_SLMT()**。

3.3 檢查是否有錯誤(GET_ERROR)

檢查是否有錯誤，如有再**GET_ERROR_CODE** 取得 **ERROR_CODE**並查相關原因，相關處理檢查，及正確設定，也可以讀取目前**DI**狀態，確認**DI**輸入是否正確。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**3.5" i8094H_GET_DI()**。

3.4 Motion 基本設定

Motion 基本設定主要是針對一般必要性設定分別如下:

1 軸輸出**PULSE**模式設定，**Pulse/Dir**、**CW/CCW…**

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.4” i8094H_SET_PULSE_MODE()**。

2 設定軸速度輸出最大範圍，設定每一軸最高速度

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.5” i8094H_SET_MAX_V ()**。

3 設定編碼器輸入參數(如需要)

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.11” i8094H_SET_ENCODER()**。

4 設定數位輸入雜訊濾波功能(如需要)

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.15” i8094H_SET_FILTER()**。

5 指定軸為圓形運動軸(環狀計數器)(如需要)

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.16” i8094H_VRING_ENABLE()**。

3.5 Motion 動作測試(手動外部輸入)(如需要)

實際測試時可用手動驅動功能，做一些基本前後移動動作，確認**DI**信號是否正常，正負方向是否正確，以便做進一步線路及參數調整，主要有下列三種方法可以選其一運用:

1 手輪脈波驅動: 用**A/B**相手輪(手動脈波產生器，如附圖)做為前後之控制。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.18.1” i8094H_EXD_MP()**。



2 固定脈波驅動: 利用兩按鈕開關，可設定每按一下走幾步(**Pulse**)，一按鈕控制**Motion**前進，另一按鈕控制後退。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.18.2” i8094H_EXD_FP()**。

3 連續脈波驅動: 利用兩按鈕開關，可設定**Pulse**輸出速度(**Hz**)按下輸出，放開即停止，一按鈕控制**Motion**前進，另一按鈕控制後退。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.18.3” i8094H_EXD_CP()**。

4 外部輸入關閉: 使用完上述三項功能，必須用此指令，將它關閉。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**2.18.4” i8094H_EXD_DISABLE()**。

3.6 軸歸零

I8094A/I8094H 提供自動歸零功能，只要經適當設定後，即可下指令自動執行，主要步驟如下:

- 以高速尋找近原點開關
- 以歸零速度尋找原點開關
- 以歸零速度尋找伺服馬達 **Z** 相信號
- 以高速運動到補正值**(Offset)**位置**(**程式原點**)**

設定時，其中步驟可以選擇不執行，以符合客戶實際需求動作，執行時完全自動執行，節省**CPU**資源，及程式設計。

3.6.1 歸零設定

1 設定軸近原點輸入觸發邏輯**(**如需要**)**

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.8" i8094H_SET_NHOME()**。

2 設定軸原點輸入觸發邏輯

請參考 **"i8094H_Manual_1.3tc.pdf**章節**2.9" i8094H_SET_HOME_EDGE()**。

3 設定軸歸零速度

設定歸零速度值和開始啟動速度值**:**

請參考 **"i8094H_Manual_1.3tc.pdf**章節**5.1" i8094H_SET_HV()**。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.1.2" i8094H_SET_SV()**。

4 設定歸零模式

請參考 **"i8094H_Manual_1.3tc.pdf**章節**5.3" i8094H_SET_HOME_MODE()**。

3.6.2 執行歸零設定

1 啟動軸歸零

請參考 **"i8094H_Manual_1.3tc.pdf** 章節 **5.4" i8094H_HOME _START()**。

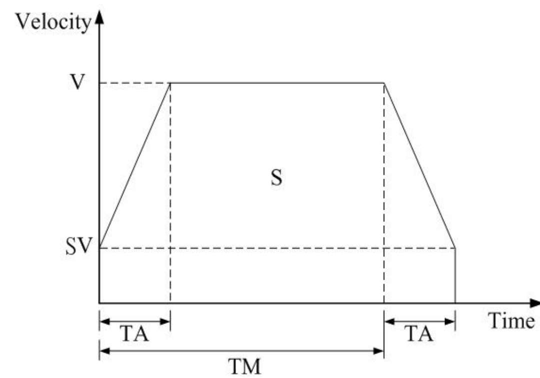
2 等待完成歸零動作

請參考 **"i8094H_Manual_1.3tc.pdf** 章節 **6.5.3" i8094H_STOP_WAIT()**。

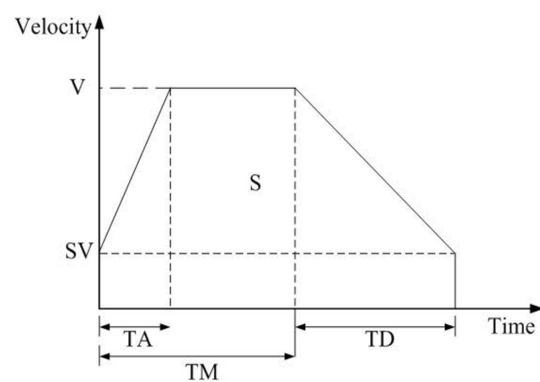
請參考 **"i8094H_Manual_1.3tc.pdf** 章節 **7.2.7" i8094H_MP_STOP_WAIT()**。

3.7 Motion 基本運作

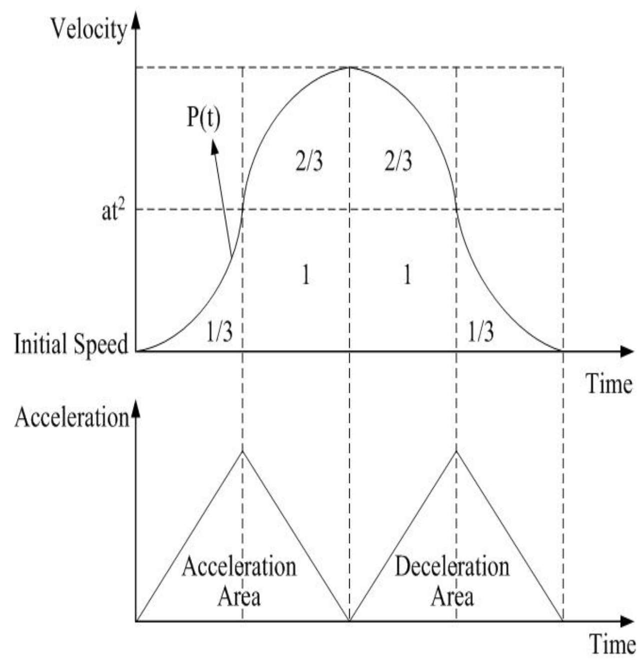
3.7.1 一般運動控制速度曲線分類



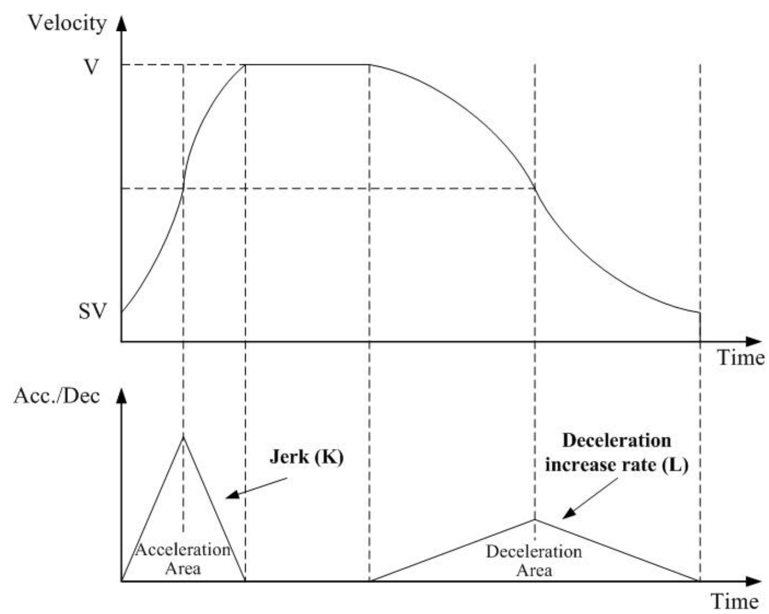
1 對稱 T 型運動控制速度曲線(如 SV 大於等於 V,將執行定速驅動)



2 非對稱 T 型運動控制速度曲線



3 對稱 S 型運動控制速度曲線



4 非對稱 S 型運動控制速度曲線

3.7.2 單軸 Motion 基本設定

1 設定加減速模式: 有四種速度模式設定。

0 → 對稱 **T** 曲線 **(SV、V、A、AO)**
1 → 對稱 **S** 曲線 **(SV、V、K、AO)**
2 → 非對稱 **T** 曲線 **(SV、V、A、D、AO)**
3 → 非對稱 **S** 曲線 **(SV、V、K、L、AO)**

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.1" i8094H_NORMAL_SPEED()**。

2 設定初始速度: 設定最低速度

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.2" i8094H_SET_SV()**。

3 設定速度: 指定運動速度

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.3" i8094H_SET_V()**。

4 設定加減速度: 指定運動時之加減速

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.4" i8094H_SET_A()**。

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.5" i8094H_SET_D()**。

3.7.3 單軸 Motion 基本動作

1 固定脈波數輸出: 執行單軸固定步數輸出。

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.9" i8094H_FIXED_MOVE()**。

2 連續脈波輸出: 執行單軸連續脈波輸出。

請參考 **"i8094H_Manual_1.3tc.pdf章節6.1.10" i8094H_CONTIUNE_MOVE ()**。

3 等待完成軸運動: 等待軸完成停止。

請參考 **"i8094H_Manual_1.3tc.pdf 章節 6.5.3" i8094H_STOP_WAIT()**。
請參考 **"i8094H_Manual_1.3tc.pdf 章節 7.2.7" i8094H_MP_STOP_WAIT()**。

3.7.4 多軸補間(向量)Motion 基本設定

1 設定補間軸: 設定補間軸對象(哪幾軸要補間)。

請參考 **"i8094H_Manual_1.3tc.pdf** 章節 **6.2.1" i8094H_AXIS_ASSIGN()**。

2 設定向量加減速模式: 設定向量加減速模式，共有如下**12**種模式

0 → 二軸(直線&弧&圓)固定向量速度 **(VV)**
1 → 二軸直線對稱 **T** 曲線 **(VSV、VV、VA、VAO)**
2 → 二軸直線對稱 **S** 曲線 **(VSV、VV、VK、VAO)**
3 → 二軸直線非對稱 **T** 曲線 **(VSV、VV、VA、VD、VAO)**
4 → 二軸直線非對稱 **S** 曲線 **(VSV、VV、VK、VL、VAO)**
5 → 二軸(弧&圓)對稱 **T** 曲線 **(VSV、VV、VA、VAO)**
6 → 二軸(弧&圓)非對稱 **T** 曲線 **(VSV、VV、VA、VD、VAO)**
7 → 三軸直線固定向量速度 **(VV)**
8 → 三軸直線對稱 **T** 曲線 **(VSV、VV、VA、VAO)**
9 → 三軸直線對稱 **S** 曲線 **(VSV、VV、VK、VAO)**
10 → 三軸直線非對稱 **T** 曲線 **(VSV、VV、VA、VD、VAO)**
11 → 三軸直線非對稱 **S** 曲線 **(VSV、VV、VK、VL、VAO)**

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.2.2" i8094H_VECTOR_SPEED()**。

3 設定向量初始速度: 設定軸之向量初始速度。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.3.3" i8094H_SET_VSV()**。

4 設定向量速度: 設定軸之向量定速度。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.3.4" i8094H_SET_VV()**。

5 設定向量加減速度: 設定軸之向量加減速度。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.3.5" i8094H_SET_VA()**。

請參考 **"i8094H_Manual_1.3tc.pdf**章節**6.3.6" i8094H_SET_VD()**。

3.7.5 多軸補間 Motion 基本動作

1 二軸直線補間: 執行二軸直線補間。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.10” i8094H_LINE_2D()**。

2 三軸直線補間: 執行三軸直線補間。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.11” i8094H_LINE_3D()**。

3 二軸圓弧補間: 執行二軸圓弧補間。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.12” i8094H_ARC_CW()**。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.12” i8094H_ARC_CCW()**。

4 二軸圓補間: 執行二軸圓補間。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.13” i8094H_CIRCLE_CW()**。

請參考 **“i8094H_Manual_1.3tc.pdf**章節**6.2.13” i8094H_CIRCLE_CCW()**。

3.8 Motion 進階運動

1 二軸矩形連續補間: 執行二軸矩形補間。

請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.1” i8094H_RECTANGLE()**。

2 二軸直線連續補間:

二軸直線連續補間初始設定(對稱 **T** 曲線加減速)。

請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.2” i8094H_LINE_2D_INITIAL()**。

執行二軸直線連續補間。

請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.2” i8094H_LINE_2D_CONTINUE()**。

3 三軸直線連續補間:

三軸直線連續補間初始設定(對稱 **T** 曲線加減速)。

請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.3” i8094H_LINE_3D_INITIAL()**。

執行三軸直線連續補間。

請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.3” i8094H_LINE_3D_CONTINUE()**。

4 其他補間: 多點連續補間、三軸螺旋運動、二軸比例運動、同步輸出 Line Scan 運動

詳情請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.4.4~6.4.10”**。

3.9 Motion 同步運動

i8094A/i8094H 還提供許多同步運動功能,如比較 **EP,LATCH….**

詳情請參考 **“i8094H_Manual_1.3tc.pdf** 章節 **6.3.1~6.3.5”**。

4 軟體快速上手

4.1 WinCon eVC++

4.1.1 確認相關檔案

請確認您有以下相關檔案:

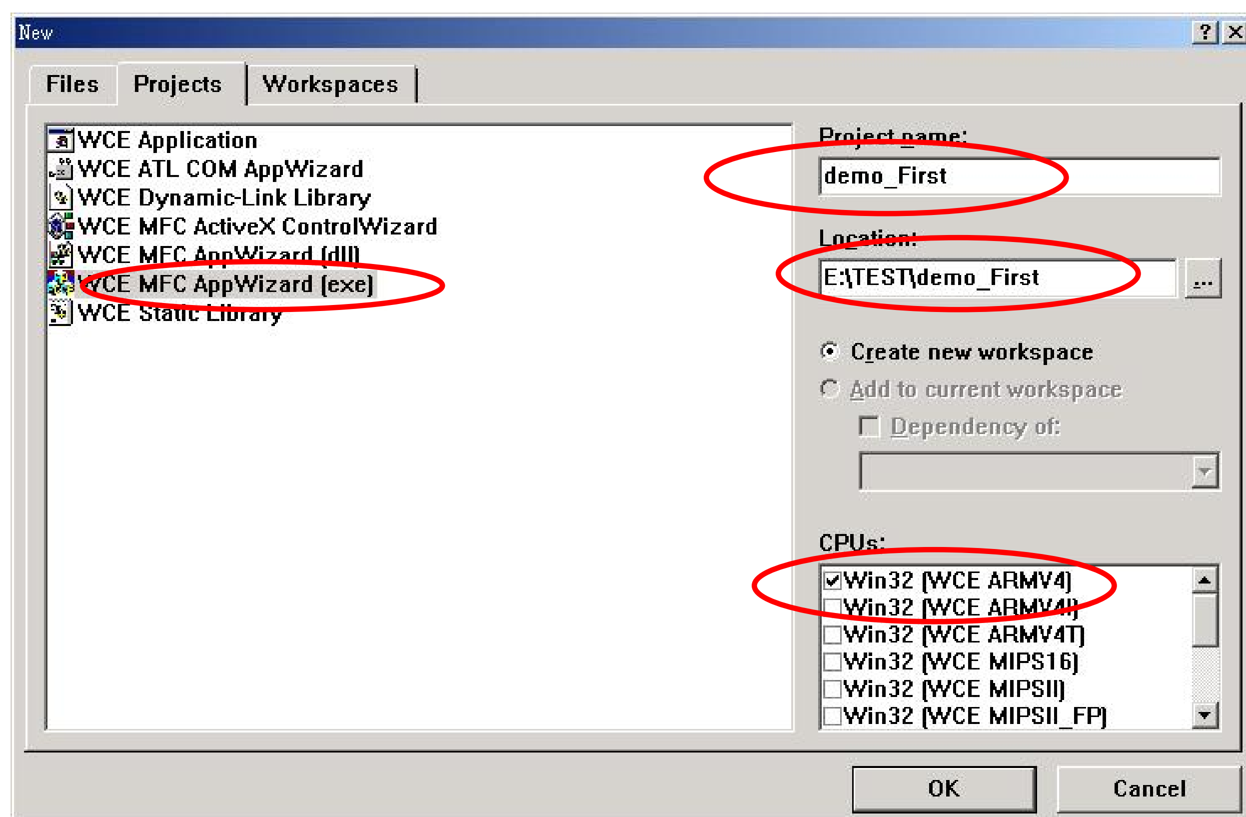
1. **i8094H.lib**
2. **i8094H.dll**
3. **i8094H.h**

如您沒有,請找 **CD** 或到我們的網站下載最新版本資料

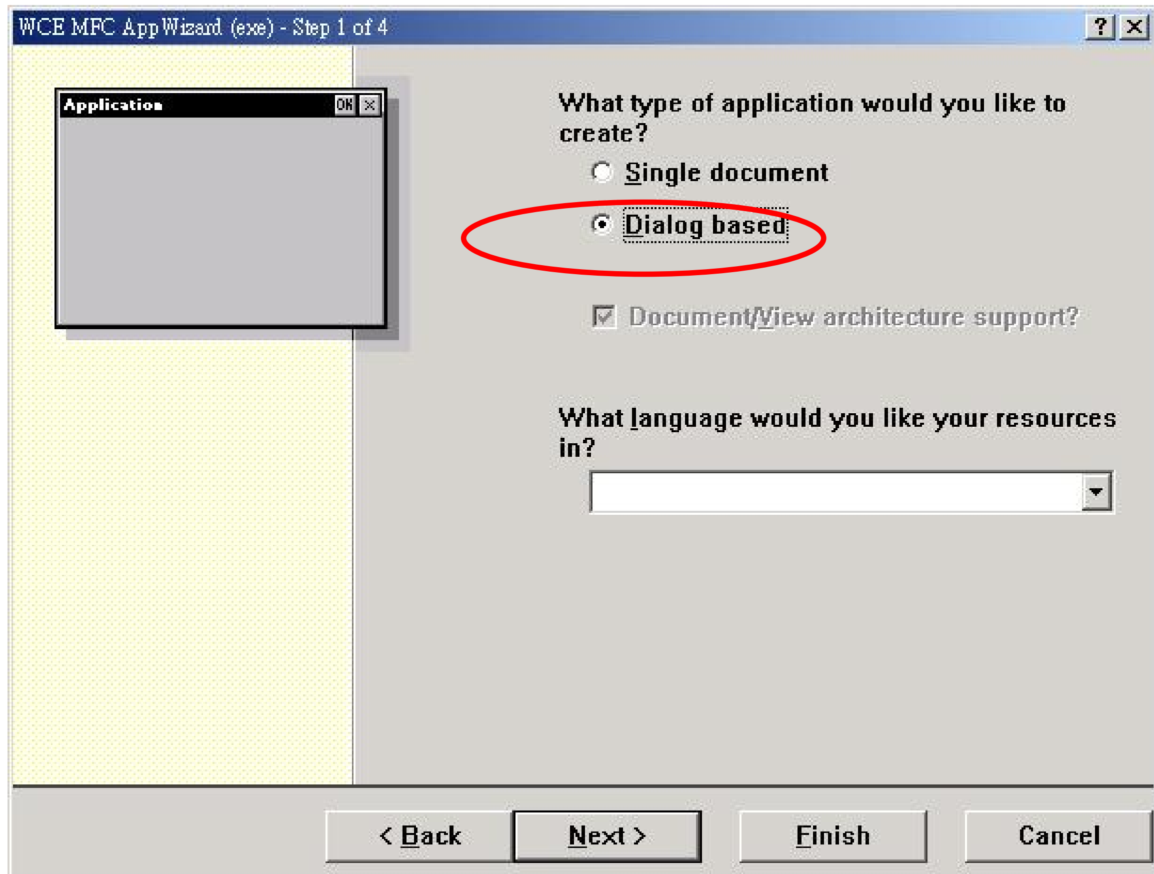
http://www.icpdas.com/download/download-list.htm

4.1.2 新增一 eVC++應用程式專案

請開啟 **eVC++ 4.0** 軟體。然後，請按滑鼠鍵**“File” -> “New”**來開啟新程式。在**“Projects“** 標籤，選擇 **“WCE MFC AppWizard (exe)”** 並且設定專案名稱為 **”Demo_First”**並在**“Location”**填入它的檔案路徑。然後，在中央處理器列表框中選擇 **“Win 32[WCE ARMV4]“** ，如果必要的話也一起勾選其他的選項。最後按滑鼠鍵 **”OK”** 。



選擇 **Dialog based** 按 **“NEXT”**



再按 **"Finish"**

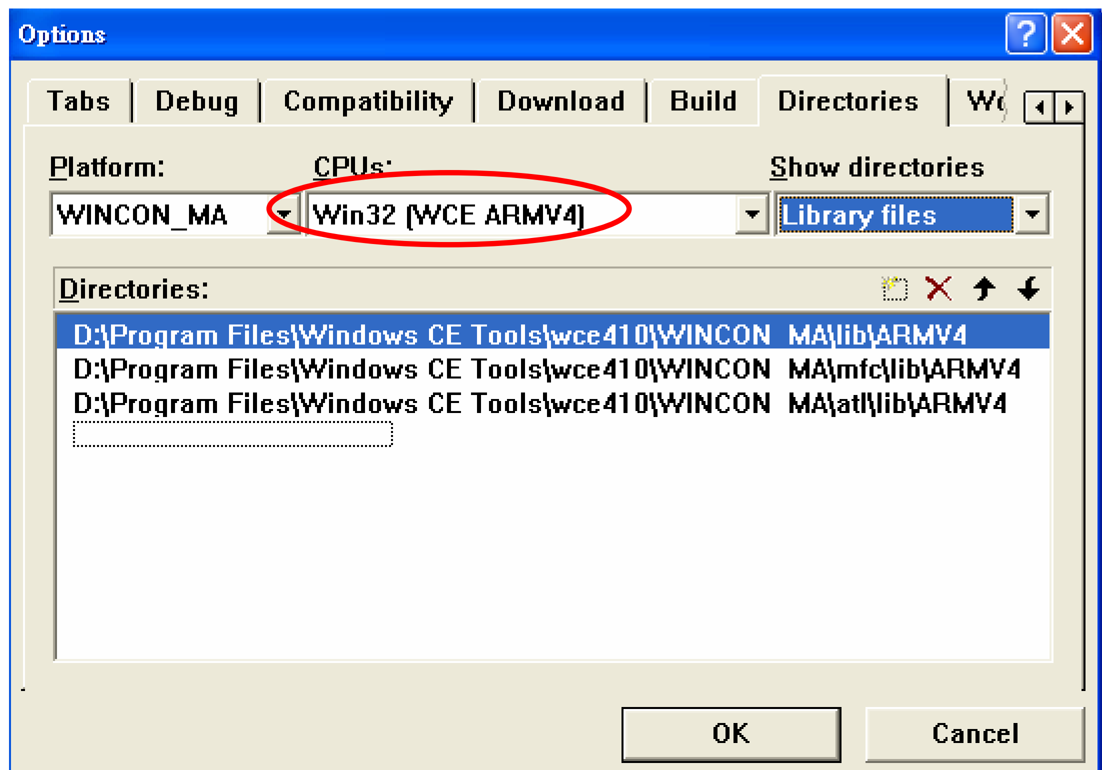
即完成開一新專案

4.1.3 在 eVC++ 專案中 Lib 參考路徑

A. 在“Tools” 工能表中開啟“Options” 對話框。

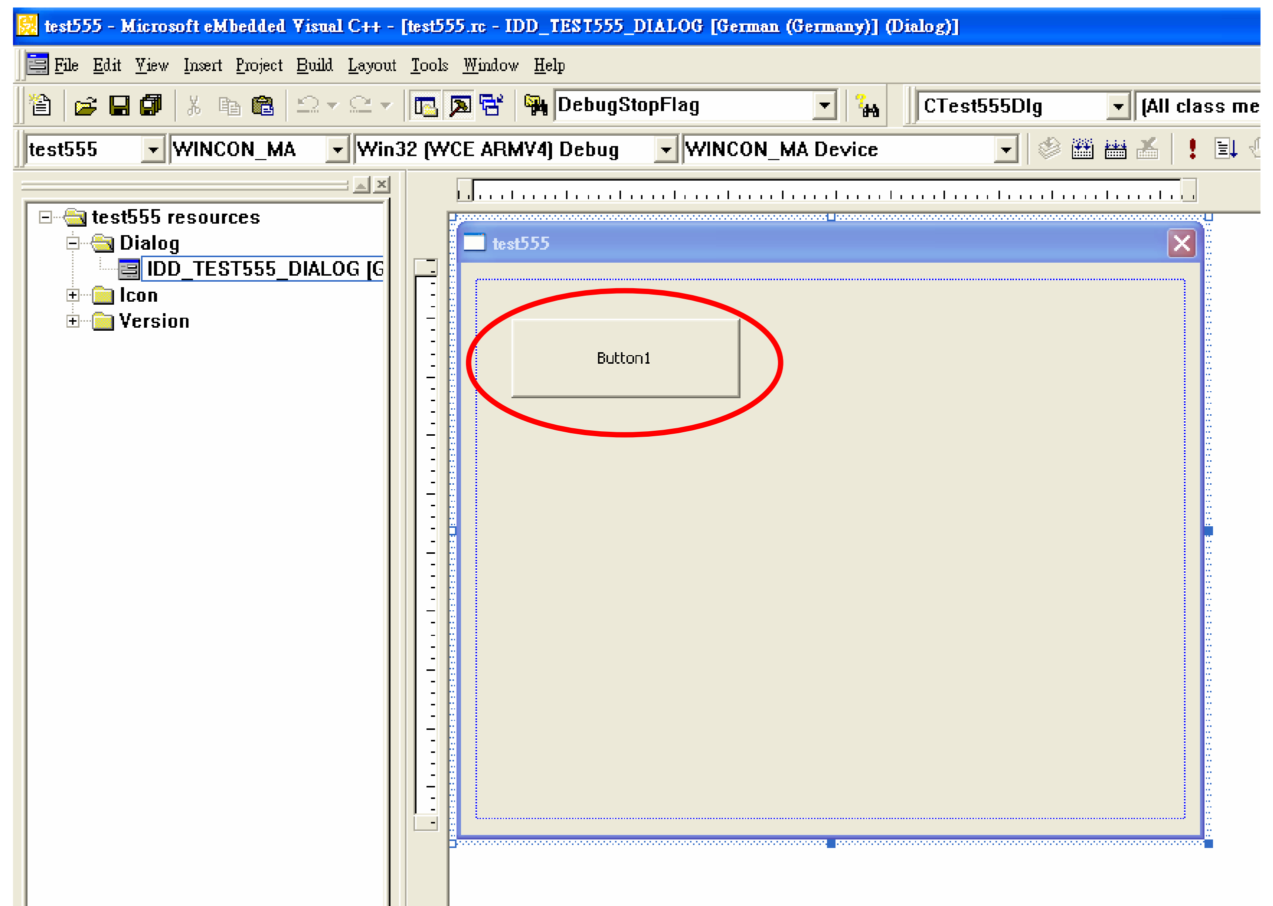
B. 選“D irectories“ 標籤，在 “Platform” 項目選擇 “WINCON_MA”， 在 “CPUs” 項目選擇“Win32 [WCE ARMV4]”。

C. 分別確認“Include files”和“Library files”的路徑位置。



4.1.4 在 eVC++ 專案中開始應用

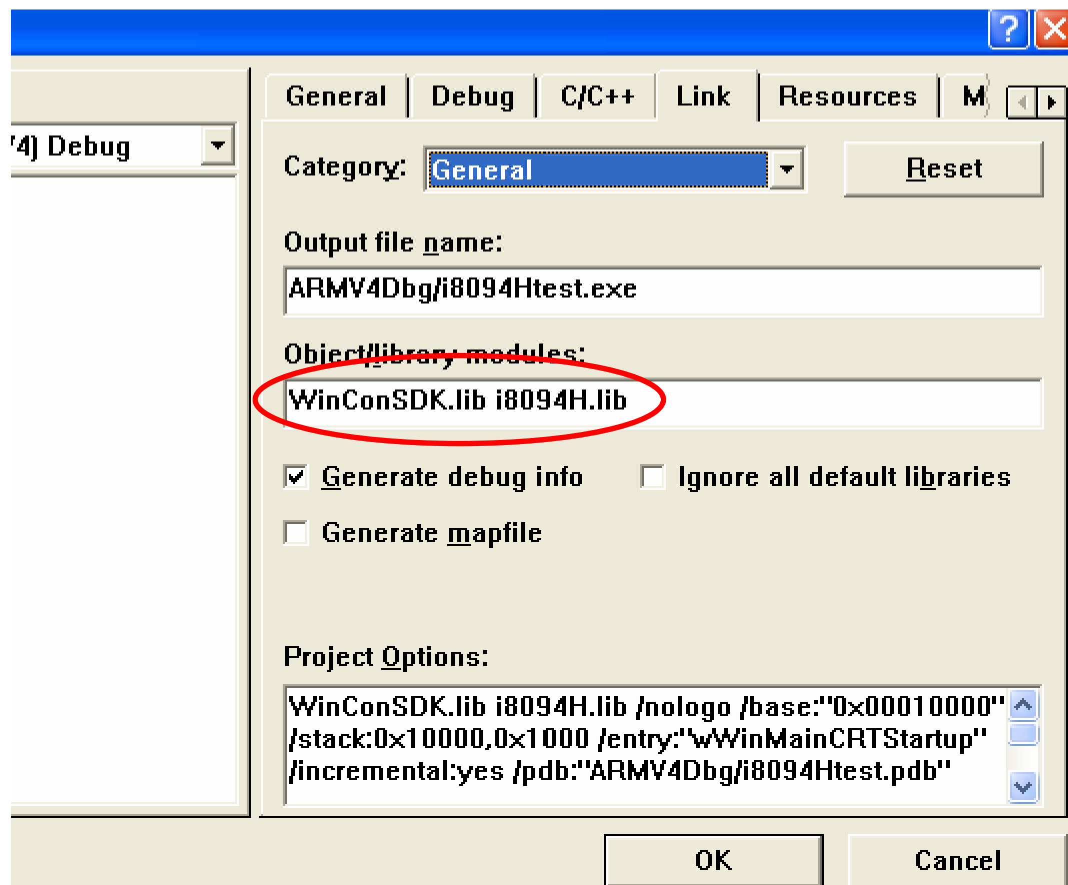
在 Dialog 中加入一 BUTTON 如下圖:



在 BUTTON 快按兩下，並產生一副程式，並在檔案起始位置加入”

```
#include "WinConSDK.h"
#include "i8094H.h"
```

請在功能表中選 "Project"->"Setting" 出現如下對話框，選 "Link" 頁籤，並在 Object/library modules:輸入 WinConSDK.lib、i8094H.lib(如下圖)，並按 OK。
後續請配合第五章 EzMake 所產生的 MP(Macro Program)使用!



4.2 WinCon Microsoft Visual Studio .NET 2003(VB.NET，C#)

Reserved

4.3 I-8000 Turbo C++

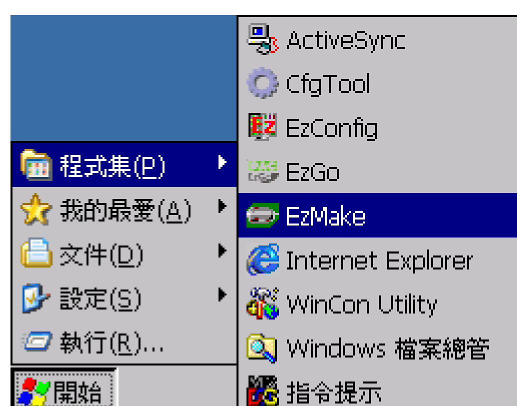
Reserved

5 MP 產生工具 EzMake

5.1 執行 EzMake

方法一:按下開始鍵-->選擇程式集→選擇 EzMake

方法二:直接由放置 EzMake 的資料夾中執行
\CompactFlash\EzProg-I\EzMake\EzMake.exe



5.2 選擇 I-8094H

在 EzMake 首頁(Fig. 5.1)會出現 Wincon 上一共有多少 I-8094H,選擇要使用的 I-8094H 後按下 OK

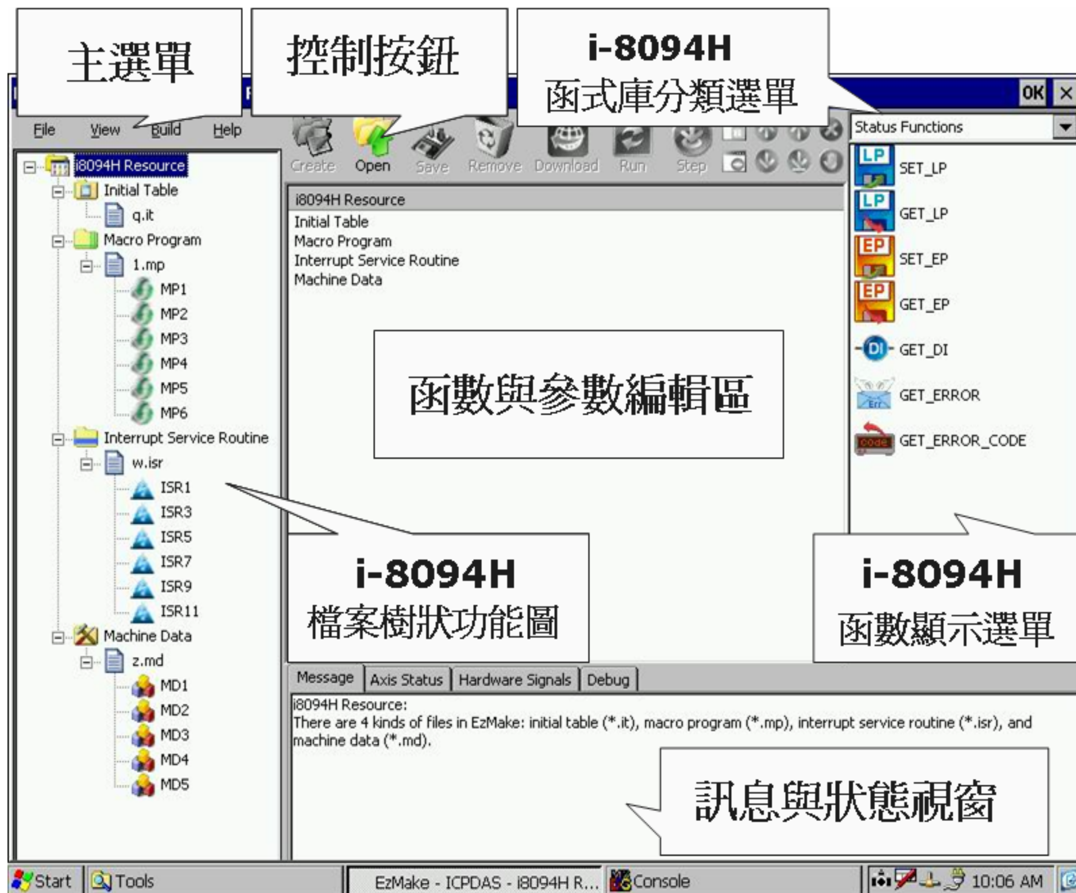
注:只有使用的 I-8094H 會出現"Used",其餘皆不顯示



Fig. 5.1 EzMake 首頁

5.3 操作頁介紹

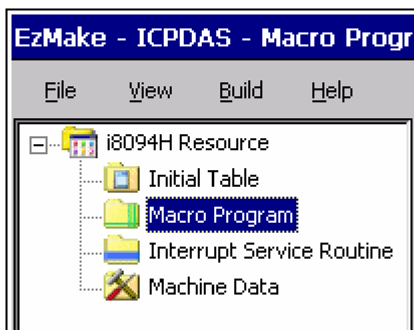
操作頁分成 7 個區塊:操作順序一般為樹狀圖→主選單→控制按鈕→函式庫分類選單→函數顯示選單→函數與參數編輯區→訊息與狀態視窗



5.3.1 樹狀圖

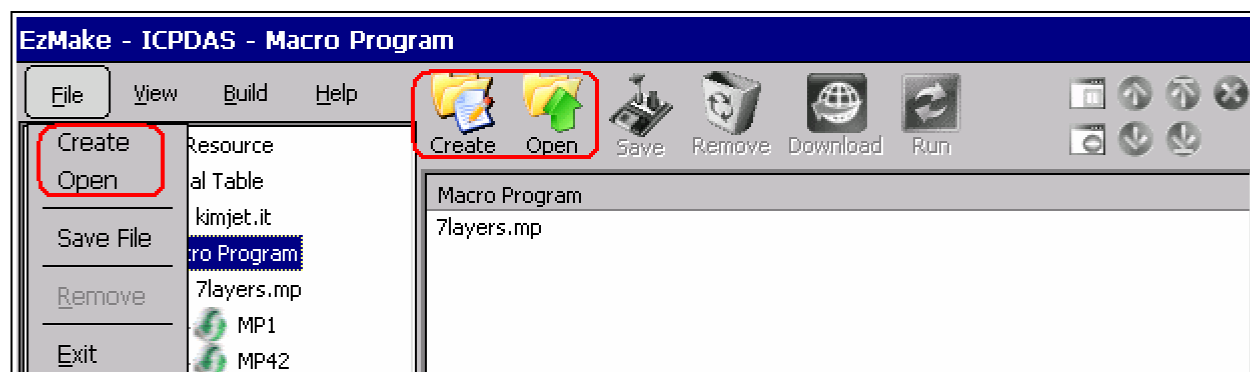
一進到 EzMake 後，在沒開啟任何檔案情況下樹狀圖有四個分支,分別有四個功能:

Initial Table:編輯 **I-8094H** 的初始設定
Macro Problem:產生 **MP** 的部份
Interrupt Service Routine:產生 **ISR** 的部份
Machine Data:編輯斷電保持資料



5.3.2 主選單

在樹狀圖選擇要開啟(Open)或新建(Create)的檔案類型後,可以在主選單或控制按鈕來選擇要執行的動作



5.3.2.1 新建檔案

新建檔案步驟如下:

Initial Table

每一個 **Initial Table** 都只能對畫面上函數與參數編輯區的函數進行編輯(**Fig. 5.2**)

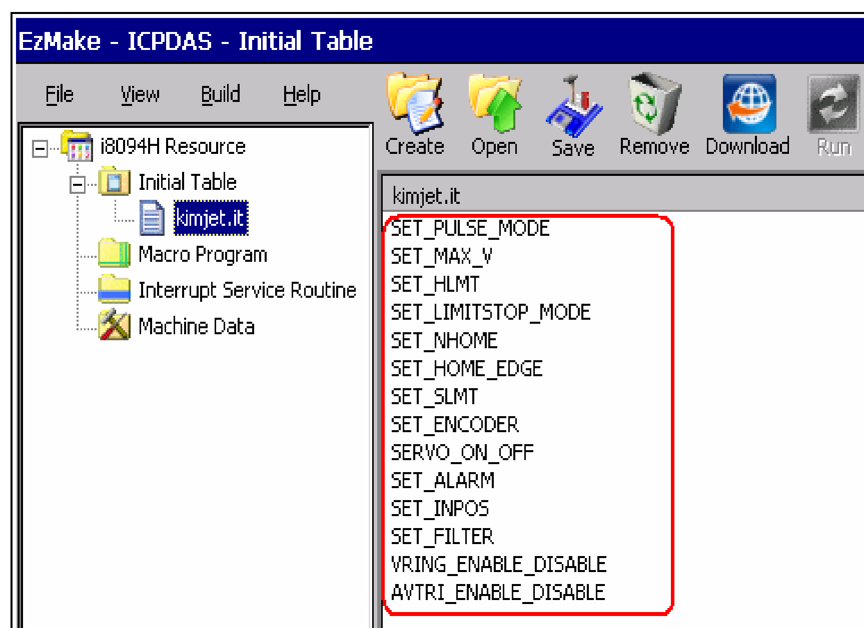


Fig. 5.2 Initial Table

Macro Program & Interrupt Service Routine

1.In Fig. 5.3 首先在 FileName 的地方輸入小於 10 個 characters 的檔名
2.在 MP1~MP157 選擇要加入的 MP,158 個 MP 共有 5 種
   stacks(8/16/32/128/512),依所需加入
   ISR 的部分和 MP 相同,只是 Function 數和 ISR 數目變少
3.MP 加入後可以編輯 Description
4.按下 OK,完成創建

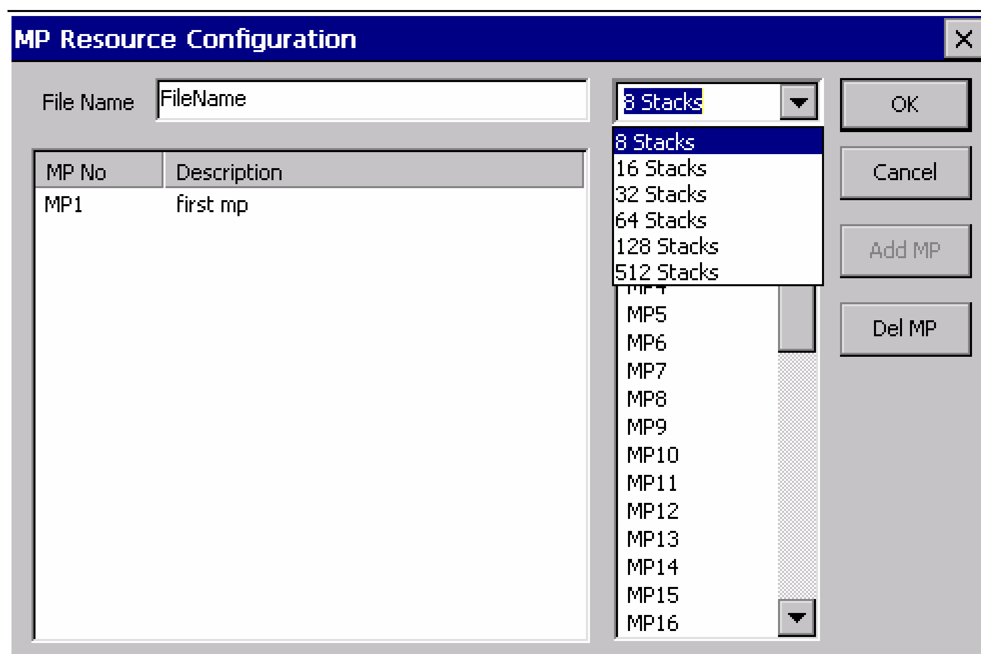
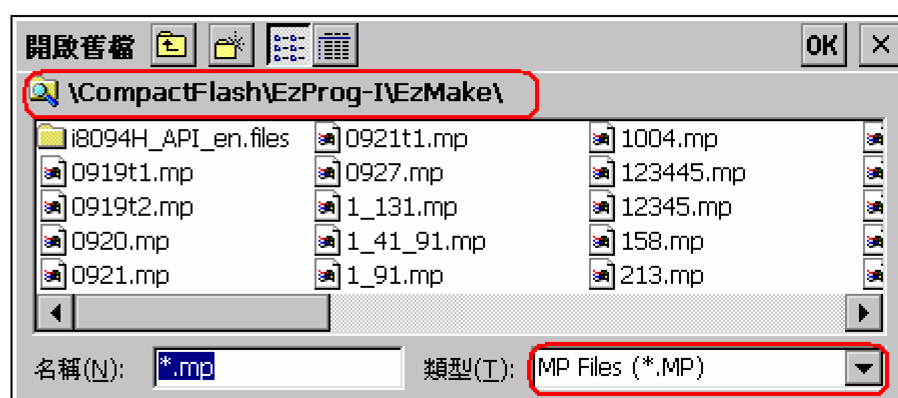


Fig. 5.3 MP Resouse Configuration

5.3.2.2 開啟檔案

Save 檔案時預設路徑為\CompactFlash\EzProg-I\EzMake\,所以除了使用者另外儲存不同地方,檔案都是放在這個路徑下
開啟檔案時,如果在樹狀圖已先點選 MacroProgram,那麼開啟的類型會限定只有副檔名是 mp 的檔案



5.3.3 函數與參數編輯區

檔案開啟後在函數與參數編輯區可以編修參數

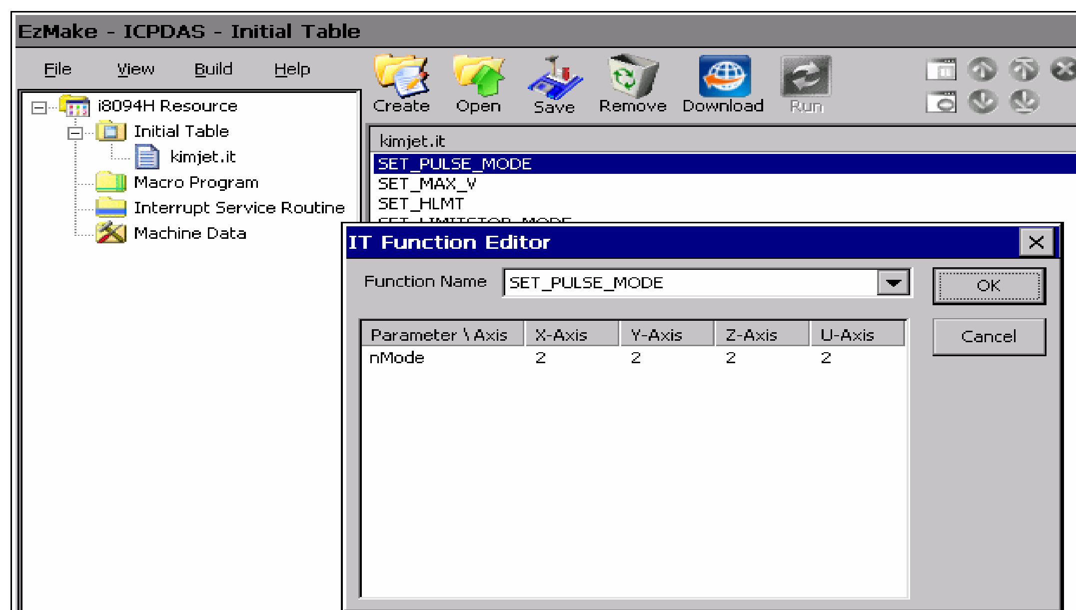


Fig. 5.4

圖 **5.4** 為 **Initial Table** 的畫面,只能針對畫面上的函數編輯修改,不能增加減少函數

編修時,只要左鍵雙擊要編修的函數兩下就會出現編修畫面,接著再依照要輸入的參數更改即可,**Macro Program** 和 **Interrupt Service Routine** 的編輯修改和 **Initial Table** 一樣,**Machine Data** 是資料儲存所以不同於其他三類(圖 **5.5)**

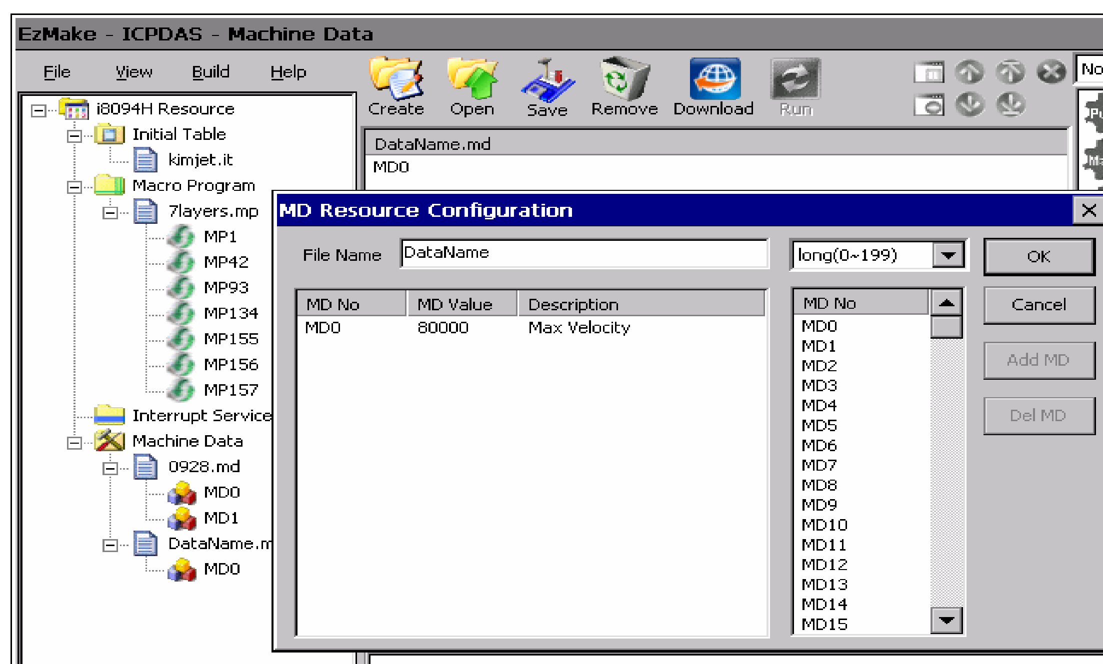
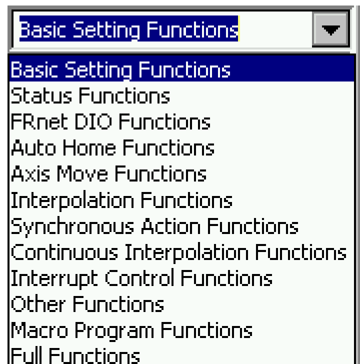


Fig. 5.5 MD Resource Configuration

5.3.4 函式庫分類選單

完成創建新檔之後,接著就是加入所需函數



在函式庫分類選單區可以依要加入函數之所屬類別選擇,或者選最後一項(全部函數)

5.3.5 函數顯示選單

選定函數類別後,在函數顯示選單內(Fig. 5.6 紅色圈選區)會出現該類別所有的函數,點選要加入的函數,再設定參數值後即完成編輯

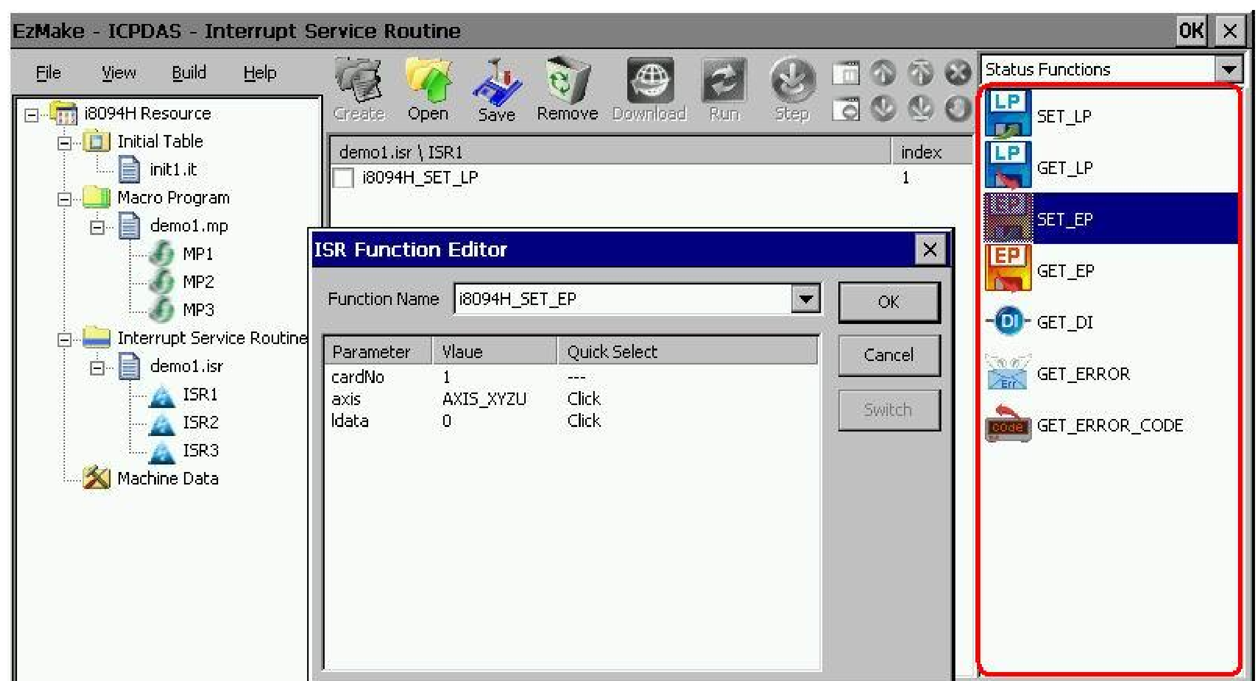
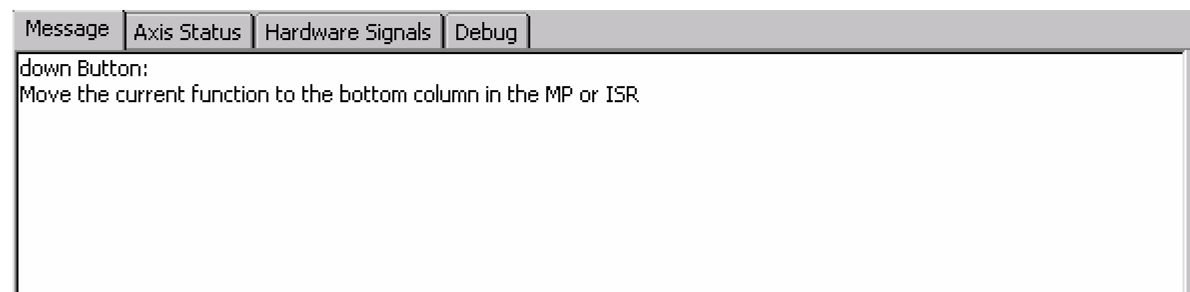


Fig. 5.6 函數顯示選單

5.3.6 訊息與狀態視窗

5.3.6.1 Message

當滑鼠移到任一 **button** 時,此視窗會顯示該 **button** 功能



5.3.6.2 Axis Status

當 MP 或是 ISR 開始執行後,在視窗內會顯示當時的各種狀態

Message | Axis Status | Hardware Signals | Debug

	Logic Position	Encoder Position	Tracking Error	Current Speed		Current Acceleratoin	
X-Axis	9385	9195		10000	PPS	0	PPS/Sec
Y-Axis	0	0		0	PPS	0	PPS/Sec
Z-Axis	0	0		0	PPS	0	PPS/Sec
U-Axis	0	0		0	PPS	0	PPS/Sec

5.3.6.3 Hardware Signals

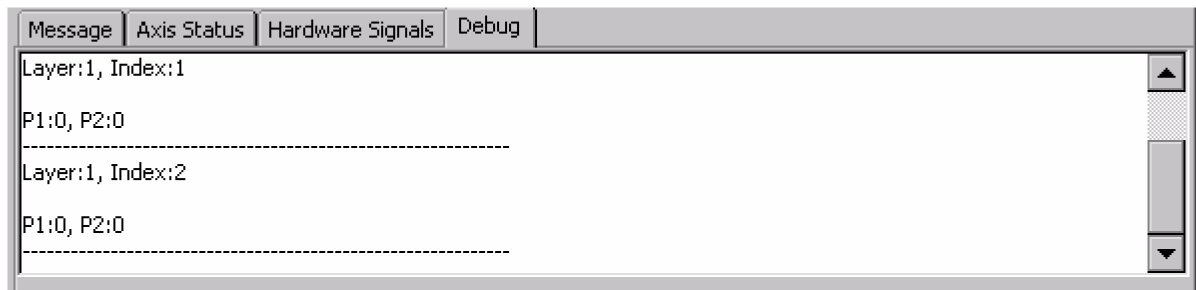
當 MP 或是 ISR 開始執行後,視窗內會依各軸狀態及位置顯示燈號

Message | Axis Status | Hardware Signals | Debug

	LMT+	LMT-	SLMT+	SLMT-	ORG	SD	ALM	IN3	INDEX	EMG	RDY	DRV	ERR
X-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
Y-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
Z-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●
U-Axis	●	●	●	●	●	●	●	●	●	●	●	●	●

5.3.6.4 Debug

當 MP 或是 ISR 開始執行時,此視窗會顯示當時執行的函數被編輯的位置



5.4 程式下載與執行

5.4.1 程式下載



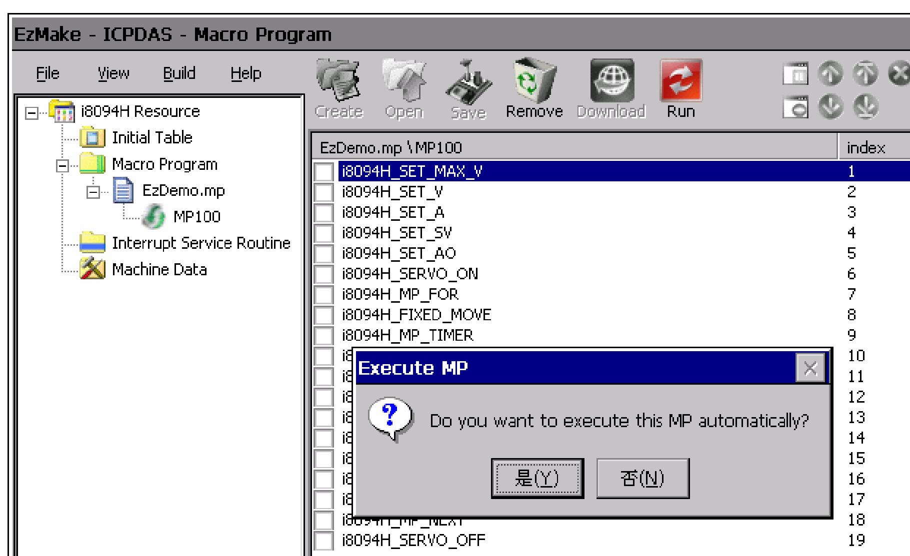
在樹狀圖選擇要下載的檔案(*.it/*.mp/*.isr/*.md),按下

後,程式便開始下載(Fig. 5.7)



Fig. 5.7 Downloading

5.4.2 程式執行



在樹狀圖選擇要下載的檔案(MPxx/ISRxx),按下

後,程式便開始執行

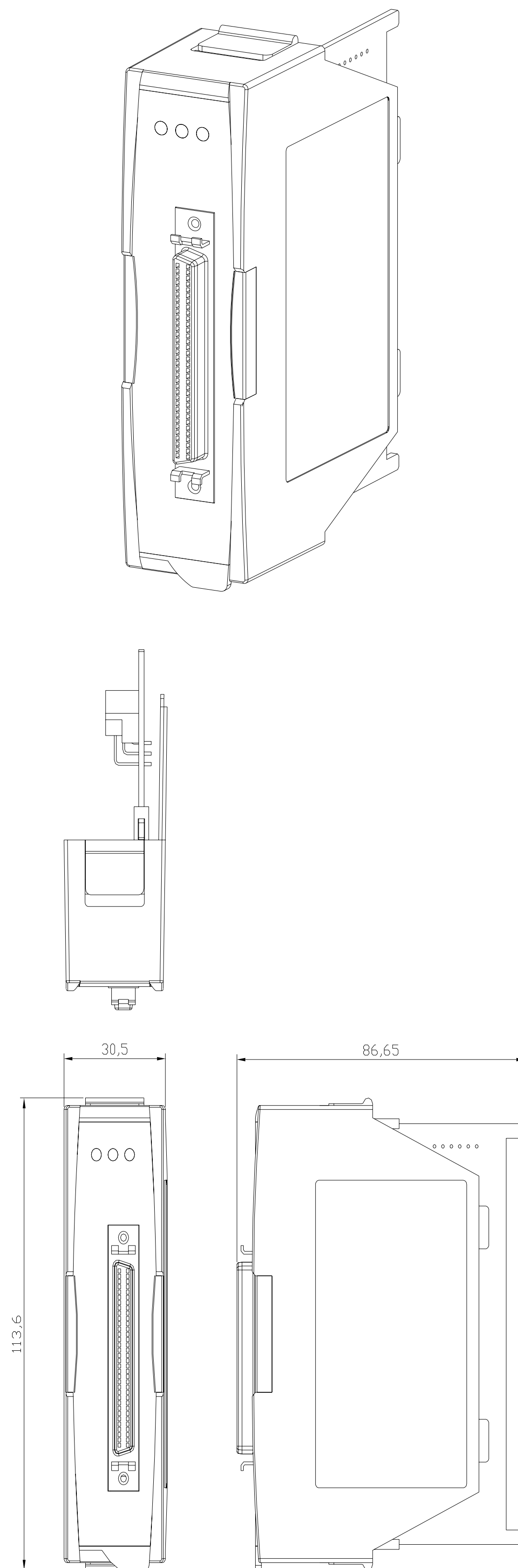
附錄 A

A.1 I8094A/I8094H 開發環境安裝內容

A.1.1 eVC ++ 4.0

1. **微軟 eVC++ 4.0: 至少到 ServicPack2(目前已到 ServicPack4)**
2. **WinCon8000_EVC4_SP1: WinCon 在 eVC++ 開發環境(WINCON_MA)**
3. **WinConSDK:WinCon 軟體開發工具(inc,lib,dll…….)**

A.2 外觀尺寸



附錄 B DN-8468 系列端子台

B.1 DN-8468M Daughter Board

The DN-8468M is the daughter board for Mitsubitch J2 Series Amplifier. It has 4-axis I/O signals.

B.1.1 Board Layout for DN-8468M

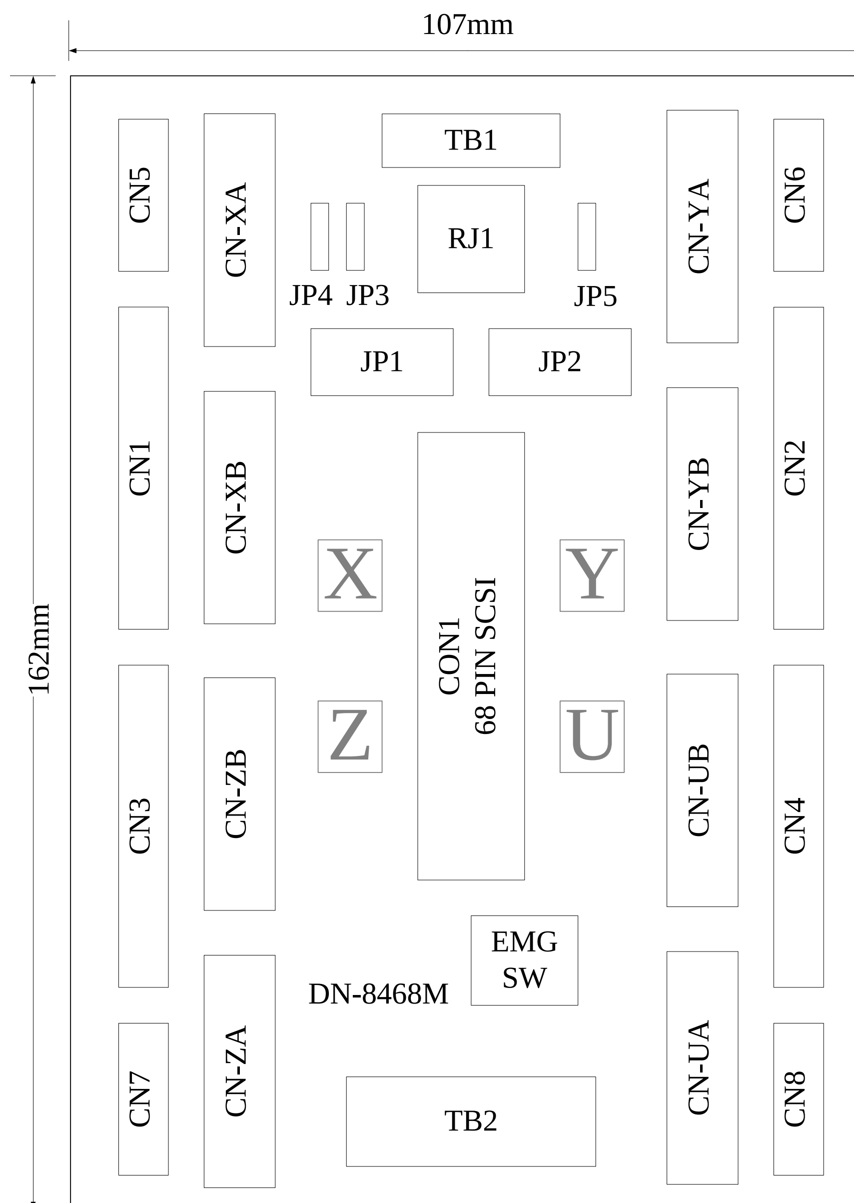


Fig. 1-1 Board layout for the DN-8468M

B.1.2 Signal Connections for DN-8468M

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468M is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468M, and the Table 1-4 shows its I/O connector signal description.

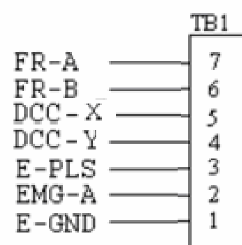


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468M, and the Table 1-5 shows its I/O connector signal description.

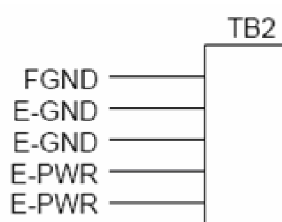


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-XA, CN-YA, CN-ZA, CN-UA (CNA connector for each AXIS)

The connectors CN-XA, CN-YA, CN-ZA, and CN-UA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.1-5 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-6 shows its I/O connector signal description.

Table 1-6 CNA Signal Connection

Name	Number	Description
A+	6	Encoder A-Phase (+)
A-	16	Encoder A-Phase (-)
B+	7	Encoder B-Phase (+)
B-	17	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	15	Encoder Z-Phase (-)
P+	3	Positive Direction Pulse Output(+)
P-	13	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	12	Negative Direction Pulse Output(-)
INP	18	Servo In Position
RDY	19	Servo Ready
E-PWR	9	EXT power +24V
E-GND	1, 10, 20	EXT power ground
NC	4,8,11,14	No connection

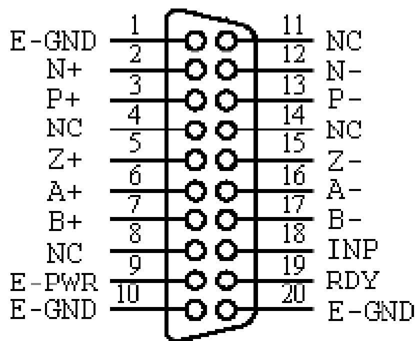


Fig. 1-5 Pin definition for CN-XA, CN-YA, CN-ZA, CN-UA

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CN-XA and the other is from CN5. In Y axis, one is from CN-YA and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CN-ZA and CN7 at the same time. In U axis, do not connect CN-UA and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN-XB, CN-YB, CN-ZB, CN-UB (CNB connector for each AXIS)

The connectors CN-XB, CN-YB, CN-ZB, and CN-UB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-7 shows its I/O connector signal description.

Table 1-7 CNB Signal Connection

Pin	Pin	Description
SVON	5	Servo On
RESET	14	Servo Reset
EMG	15	Emergent Stop
ALARM	18	Servo Alarm
E-PWR	13	EXT power +24V
E-GND	1, 10, 16,17, 20	EXT power ground
NC	2, 3, 4, 6, 7, 8, 9, 11, 12, 19	No connection

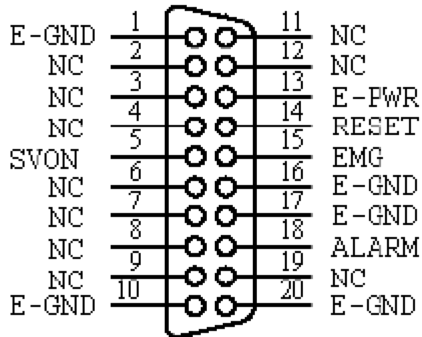


Fig. 1-6 Pin definition for CN-XB, CN-YB CN-ZB, CN-UB

> **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-8 shows its I/O connector signal description.

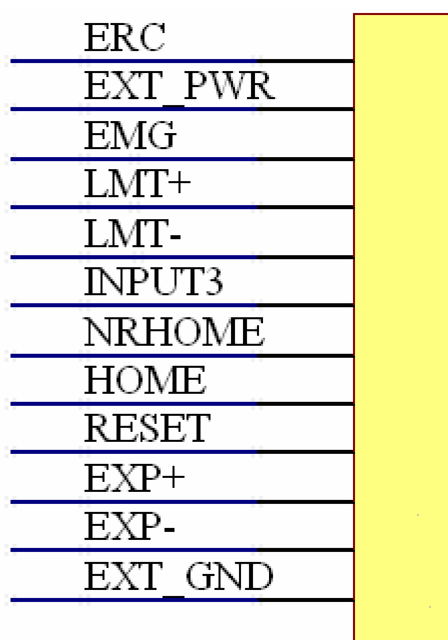


Fig 1-7 Pin definition for CN1~ CN4

Table 1-8 CN1~4 Signal Connection

Name	Number	Description
ERC	12	Error Count Clear
EXT_PWR	11	EXT POWER 24V
EMG	10	Emergent Stop
LMT+	9	Limit switch Input Signal(+)
LMT-	8	Limit switch Input Signal(-)
INPUT3	7	Input Signal (IN3)
NRHOME	6	Near HOME Sensor Input Signal
HOME	5	HOME Sensor Input Signal
RESET	4	RESET Input Signal
EXP+	3	EXT Positive Direction Pulse(+)
EXP-	2	EXT Positive Direction Pulse(-)
EXT_GND	1	EXT POWER Ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468M, and the Table 1-9 shows its I/O connector signal description.

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

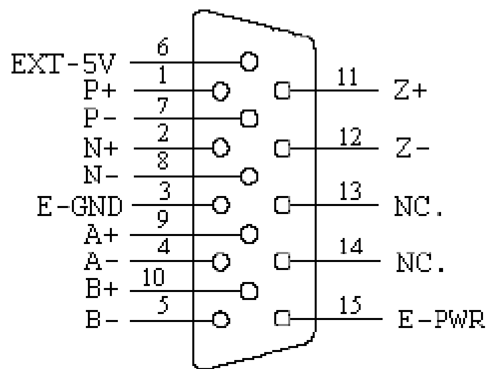


Fig. 1-8 Pin definition for CN5~CN8

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468M, and the Table 1-10 shows its I/O connector signal description.

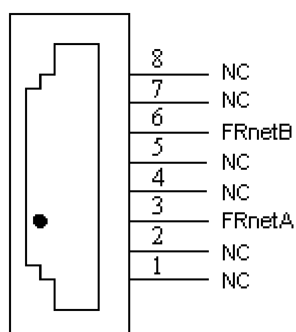


Table 1-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Fig. 1-9 Pin definition for RJ1

> **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.1.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

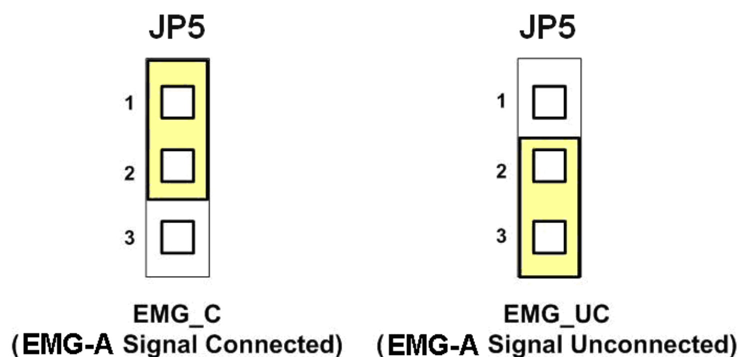


Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

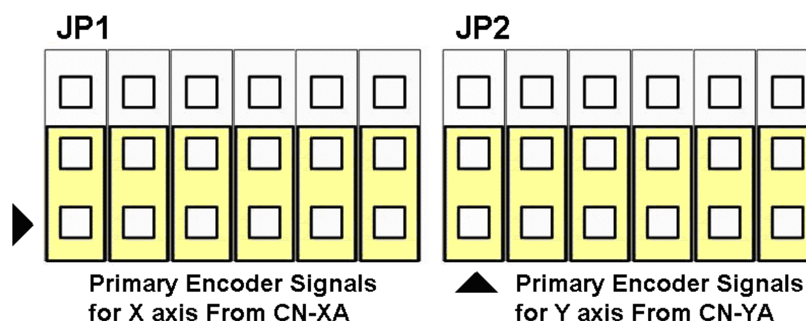


Fig. 1-11 Primary encoder signals setting

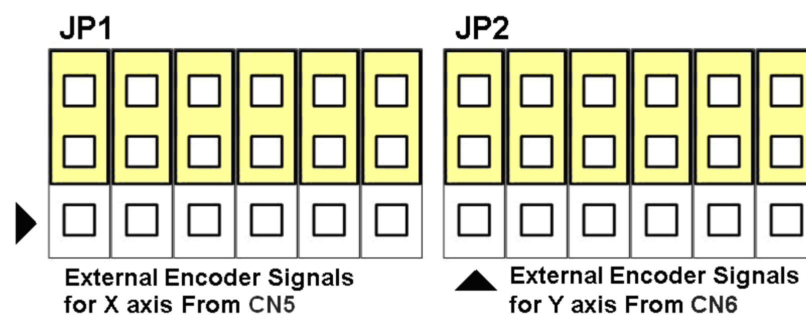


Fig. 1-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.



Fig. 1-13 EMG SW setting for normally GND (Default setting)

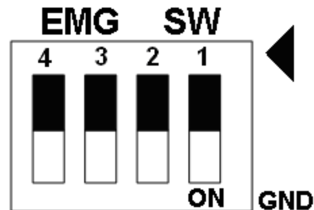


Fig. 1-14 EMG SW setting for user controlled signals.

B.2 DN-8468P Daughter Board

The DN-8468P is the daughter board for Panasonic A4 Series Ampilifier. It has 4-axis I/O signals.

B.2.1 Board Layout for DN-8468P

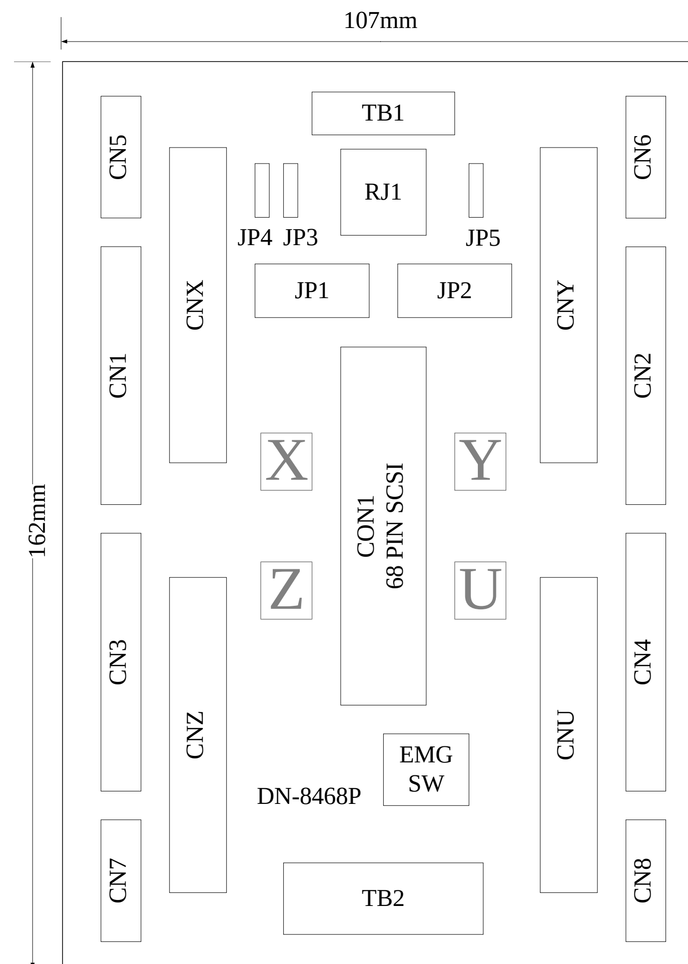


Fig. B2-1 Board layout for the DN-8468P

B.2.2 Signal Connections for DN-8468P

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468P is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-3 shows the pin assignment for the 7-pin connector on the DN-8468P, and the Table 1-4 shows its I/O connector signal description.

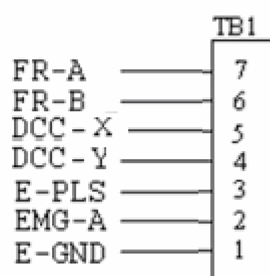


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.1-4 shows the pin assignment for the 5-pin connector on the DN-8468P, and the Table 1-5 shows its I/O connector signal description.

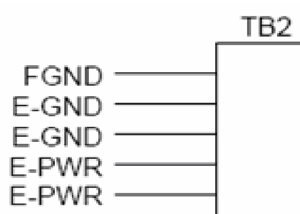


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8468P, and the Table 1-6 shows its I/O connector signal description.

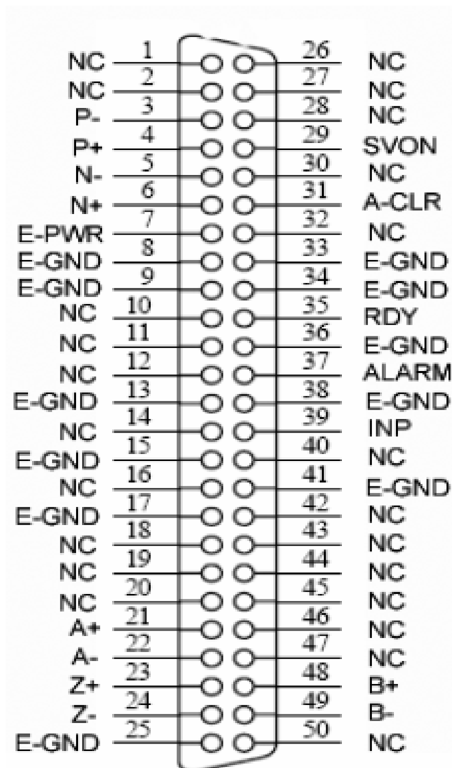


Fig. 1-5 Pin definition for CNX, CNY, CNZ, CNU

Table 1-6 CN X5 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	48	Encoder B-Phase (+)
B-	49	Encoder B-Phase (-)
Z+	23	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	4	Positive Direction Pulse Output(+)
P-	3	Positive Direction Pulse Output(-)
N+	6	Negative Direction Pulse
N-	5	Negative Direction Pulse Output(-)
INP	39	Servo In Position
RDY	35	Servo Ready
SVON	29	Servo On
A-CLR	31	Alarm Clear
ALARM	37	Servo Alarm
E-PWR	7	EXT power +24V
E-GND	8, 9, 13, 15,17, 25, 33,34, 36, 38,41	EXT power ground
NC	1,2,10,11, 12,14,16, 18,19,20, 26,27,28, 30,32,40, 42,43,44, 45,46,47, 50	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468P, and the Table 1-8 shows its I/O connector signal description.

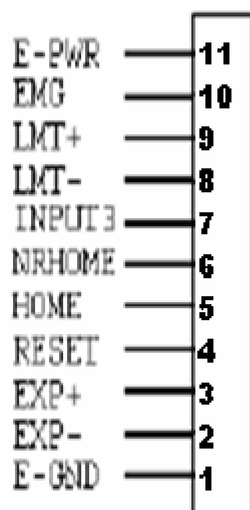


Fig.1 -7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ **CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)**

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468P, and the Table 1-9 shows its I/O connector signal description.

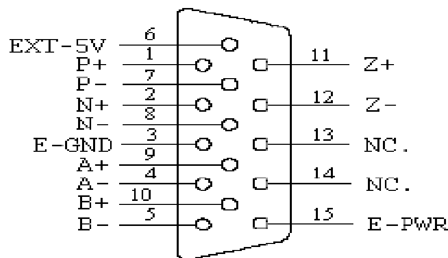


Fig. 1-8 Pin definition for CN5 ~ CN8

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don’t connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468P, and the Table 1-10 shows its I/O connector signal description.

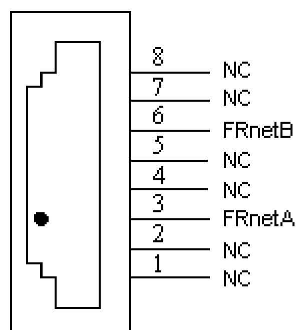


Fig. 1-9 Pin definition for RJ

Table 1-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.2.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

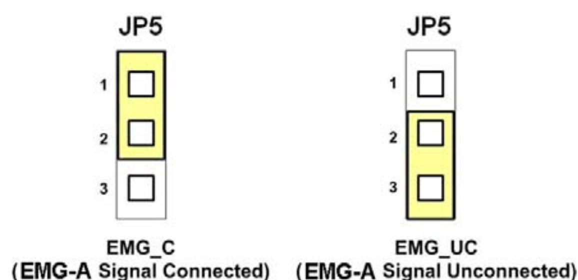


Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

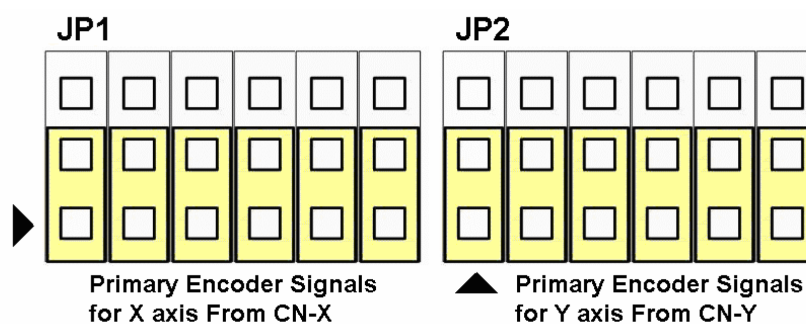


Fig. 1-11 Primary encoder signals setting

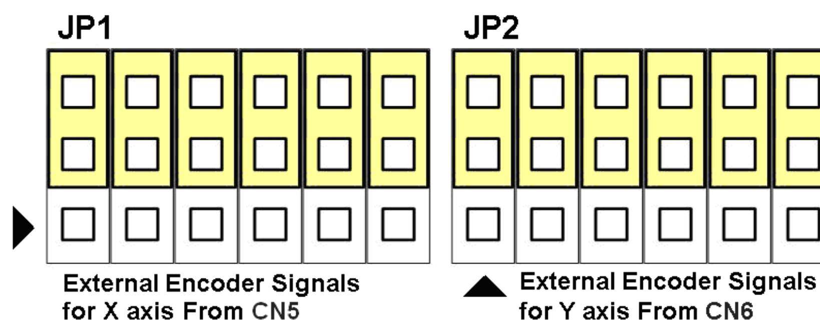


Fig. 1-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

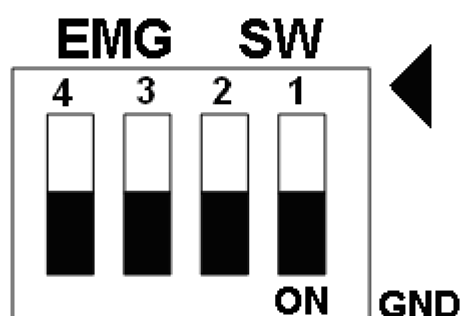


Fig. 1-13 EMG SW setting for normally GND (Default setting)

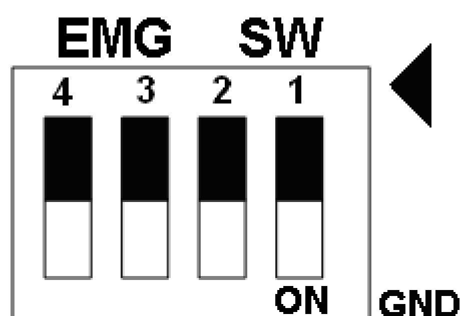


Fig. 1-14 EMG SW setting for user controlled signals.

B.3 DN-8486Y Daughter Board

The DN-8468Y is the daughter board for Yaskawa Ampilifier. It has 4-axis I/O signals.

B.3.1 Board Layout for DN-8468Y

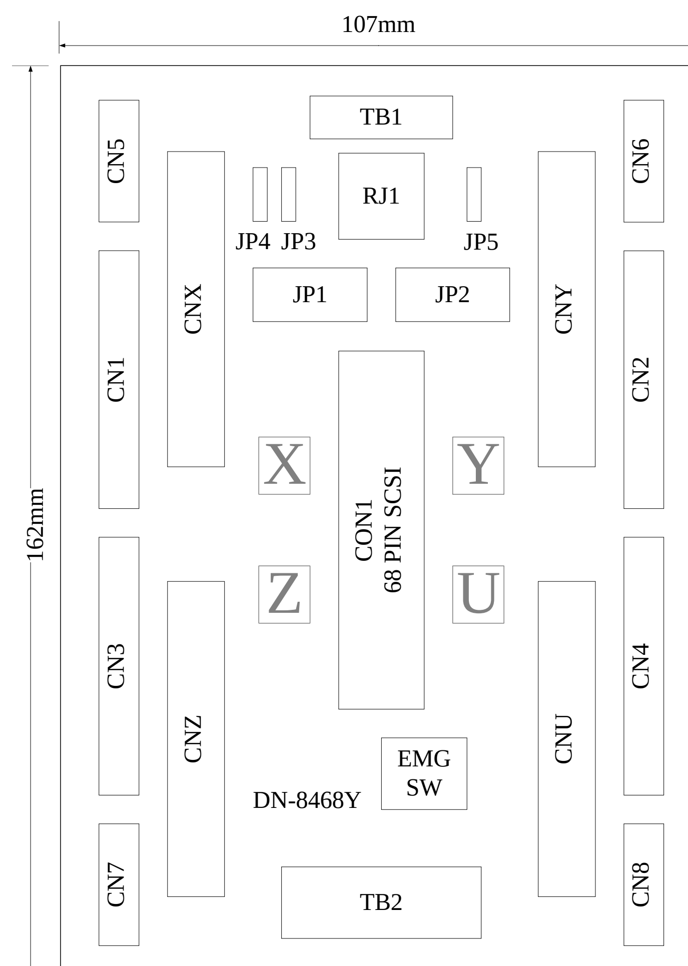


Fig. 3-1 Board layout for the DN-8468Y

B.3.2 Signal Connections for DN-8468Y

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468Y is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468Y, and the Table 3-4 shows its I/O connector signal description.

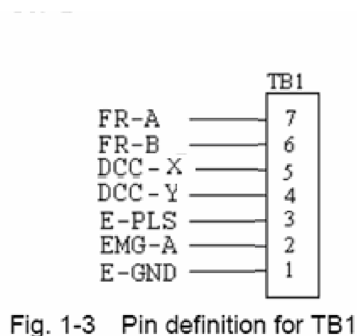


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468Y, and the Table 3-5 shows its I/O connector signal description.

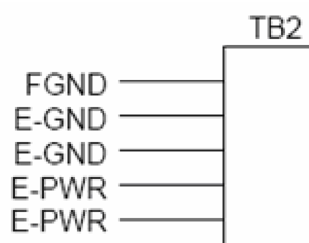


Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

Fig. 1-4 Pin definition for TB2

> **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468Y, and the Table 3-6 shows its I/O connector signal description.

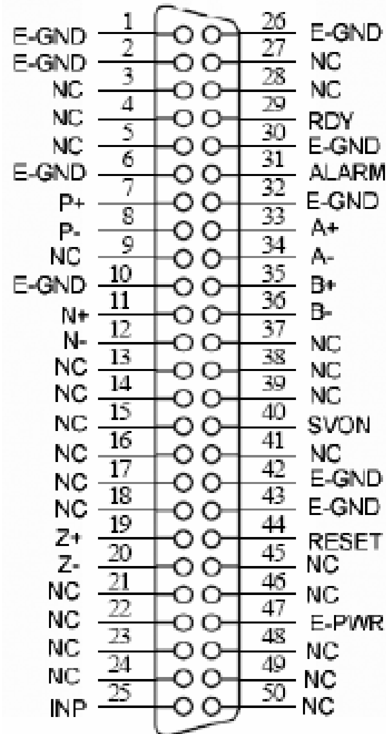


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN1 Signal Connection

Name	Number	Description
A+	33	Encoder A-Phase (+)
A-	34	Encoder A-Phase (-)
B+	35	Encoder B-Phase (+)
B-	36	Encoder B-Phase (-)
Z+	19	Encoder Z-Phase (+)
Z-	20	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	11	Negative Direction Pulse
N-	12	Negative Direction Pulse Output(-)
INP	25	Servo In Position
RDY	29	Servo Ready
SVON	40	Servo On
RESET	44	Parameter Reset
ALARM	31	Servo Alarm
E-PWR	47	EXT power +24V
E-GND	1,2,6,10, 26, 30,32, 42,43	EXT power ground
NC	3,4,5,9, 13,14,15, 16,17,18, 21,22,23, 24,27,28, 37,38,39, 41,45,46, 48,49,50,	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468Y, and the Table 3-8 shows its I/O connector signal description.

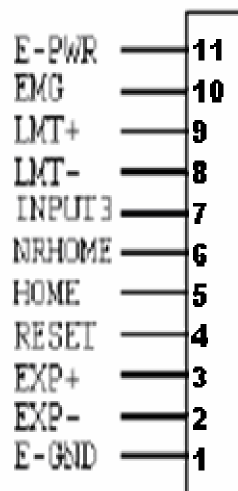


Fig.1 -7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers.   Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468Y, and the Table 3-9 shows its I/O connector signal description.

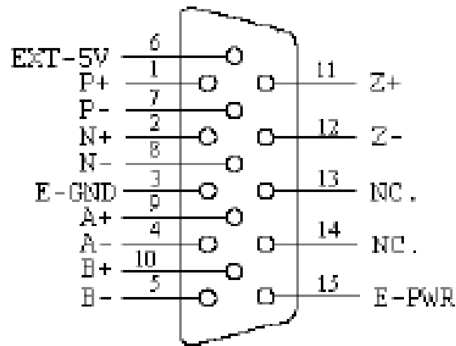


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes.   In X axis, one is from CNX and the other is from CN5.   In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis.   In Z axis, do not connect CNZ and CN7 at the same time.   In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals.   Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468Y, and the Table 3-10 shows its I/O connector signal description.

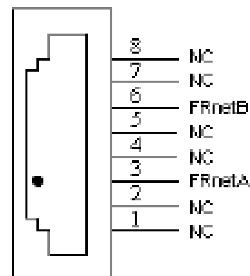


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Note: Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.3.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

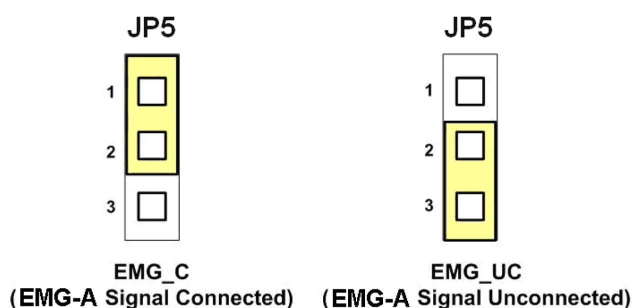


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

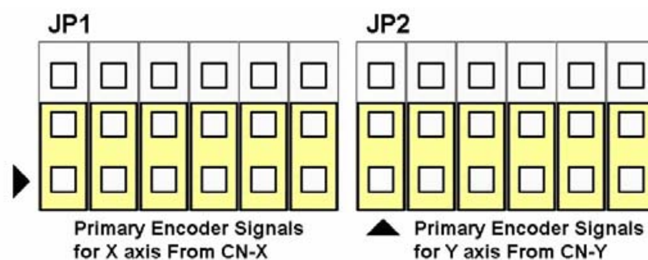


Fig. 3-11 Primary encoder signals setting

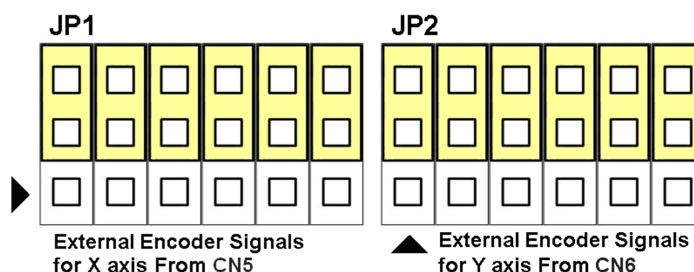


Fig. 3-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

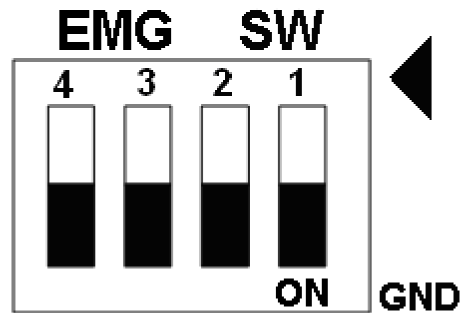


Fig. 3-13 EMG SW setting for normally GND (Default setting)

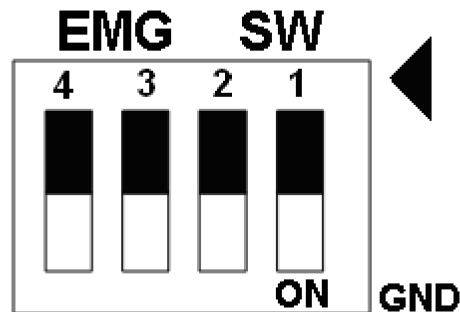


Fig. 3-14 EMG SW setting for user controlled signals.

B.4 DN-8468D Daughter Board

The DN-8468D is the daughter board for Delta ASDA-A Series Ampilifier. It has 4-axis I/O signals.

B.4.1 Board Layout for DN-8468D

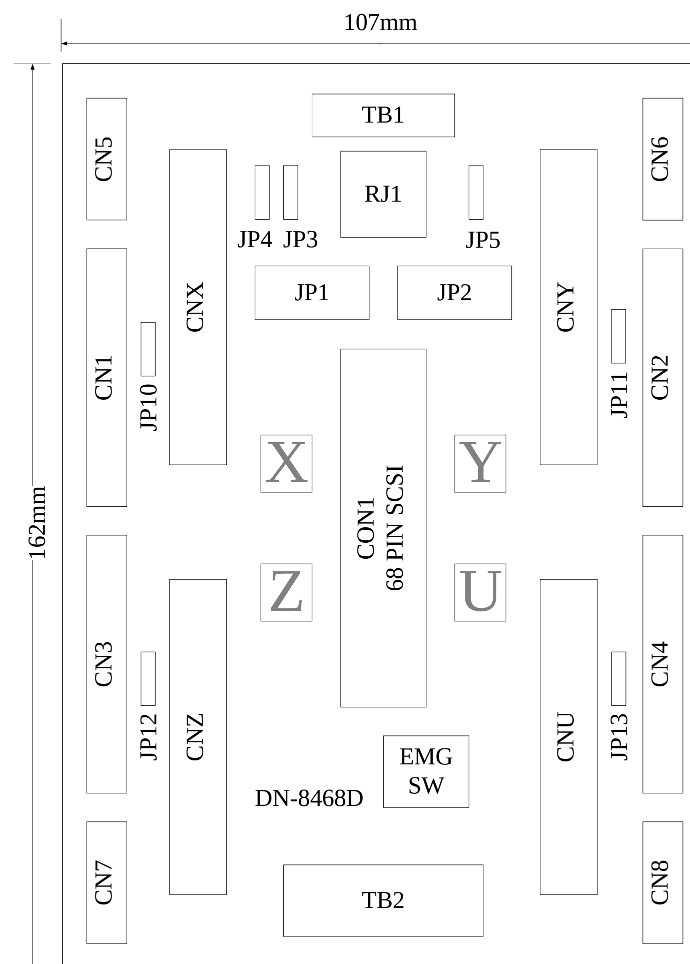


Fig. 3-1 Board layout for the DN-8468D

B.4.2 Signal Connections for DN-8468D

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468D is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468D (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

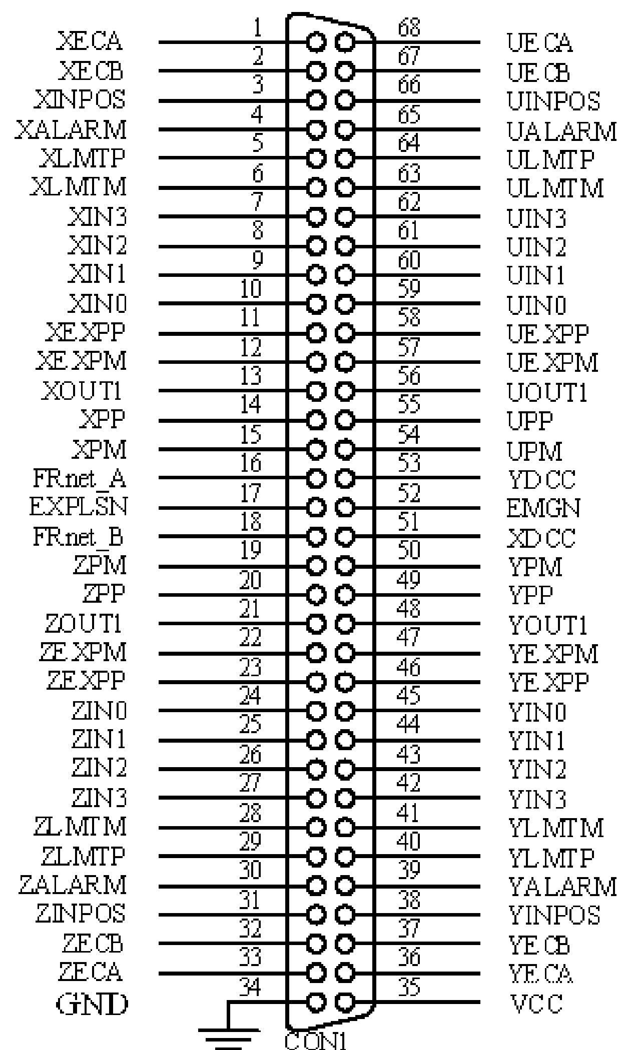


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468D I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468D I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468D, and the Table 3-4 shows its I/O connector signal description.

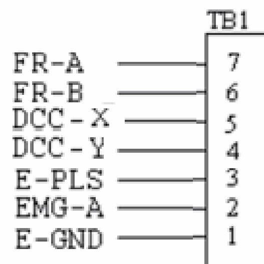


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468D, and the Table 3-5 shows its I/O connector signal description.

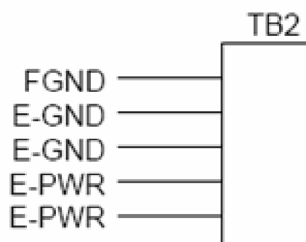


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CNX, CNY, CNZ, CNU (CN 1 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468D, and the Table 3-6 shows its I/O connector signal description.

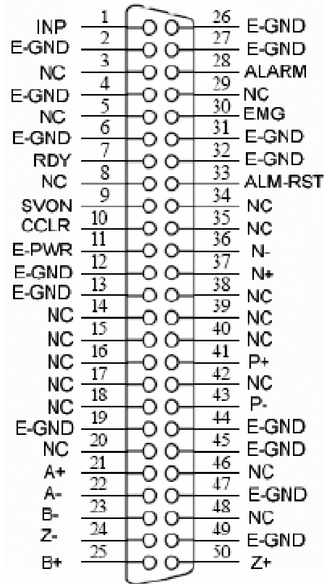


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN 1 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	25	Encoder B-Phase (+)
B-	23	Encoder B-Phase (-)
Z+	50	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	41	Positive Direction Pulse Output(+)
P-	43	Positive Direction Pulse Output(-)
N+	37	Negative Direction Pulse Output(+)
N-	36	Negative Direction Pulse Output(-)
INP	1	Servo In Position
RDY	7	Servo Ready
SVON	9	Servo On
ALM-RST	33	Alarm Reset
CCLR	10	Error Counter Clear
ALARM	28	Servo Alarm
EMG	30	Emergent Stop
E-PWR	11	EXT power +24V
E-GND	2,4,6,12, 13,19,26, 27,31,32, 44,45,47, 49	EXT power ground
NC	3,5,8,14, 15,16,17, 18,20,29, 34,35,38 39,40,42, 46 48	No connection

▶ **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
▶ **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
▶ **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 20-pin connector on the DN-8468D, and the Table 3-8 shows its I/O connector signal description.

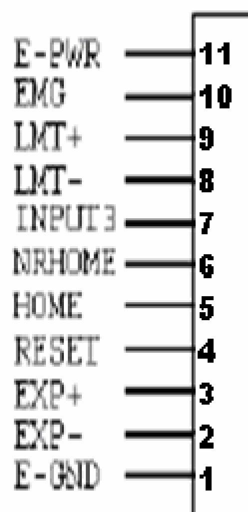


Fig.1-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468D, and the Table 3-9 shows its I/O connector signal description.

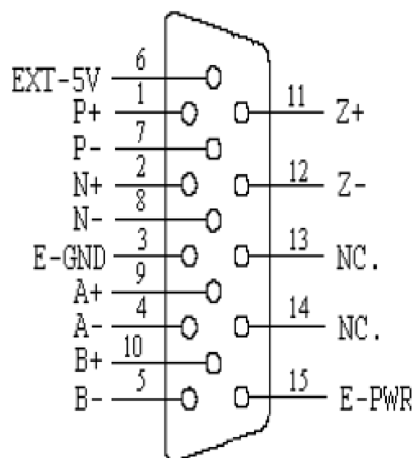


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468D, and the Table 3-10 shows its I/O connector signal description.

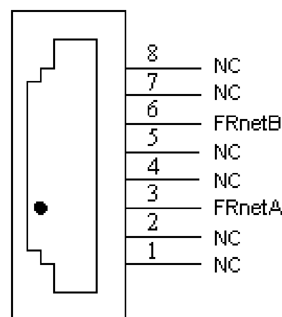


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

- **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.4.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

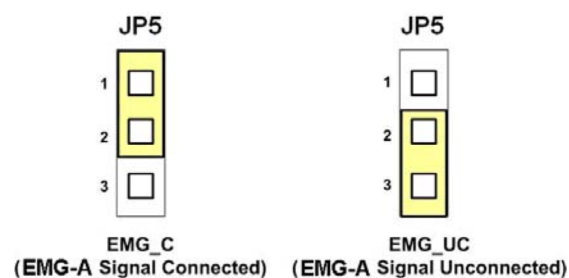


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

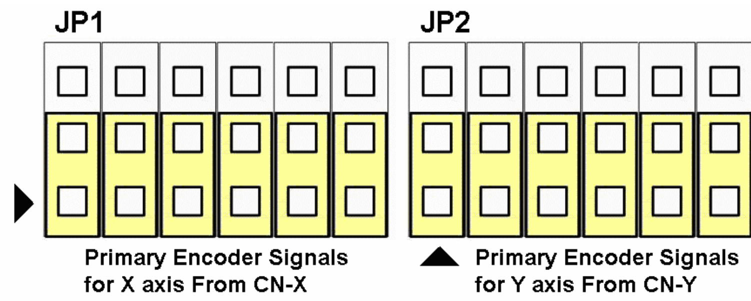


Fig. 3-11 Primary encoder signals setting

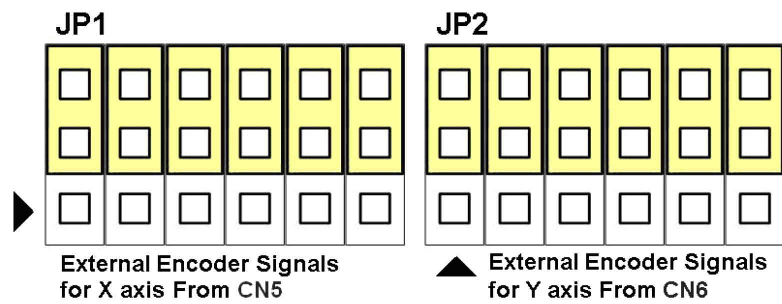


Fig. 3-12 External encoder signals setting

■ SW1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

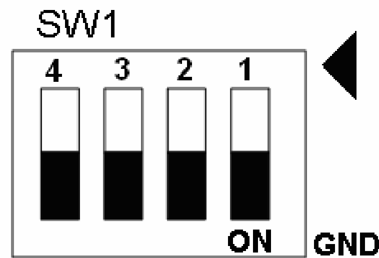


Fig. 3-13 SW1 setting for normally GND (Default setting)

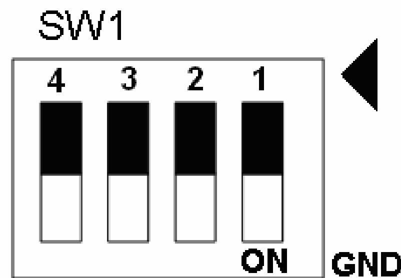


Fig. 3-14 SW1 setting for user controlled signals.

■ JP10 ~ JP13

Jumper 10 ~ Jumper 13 can select the reset function in CN1 ~ CN4 for each axis. The following diagram is shown the selection condition of the JP10.

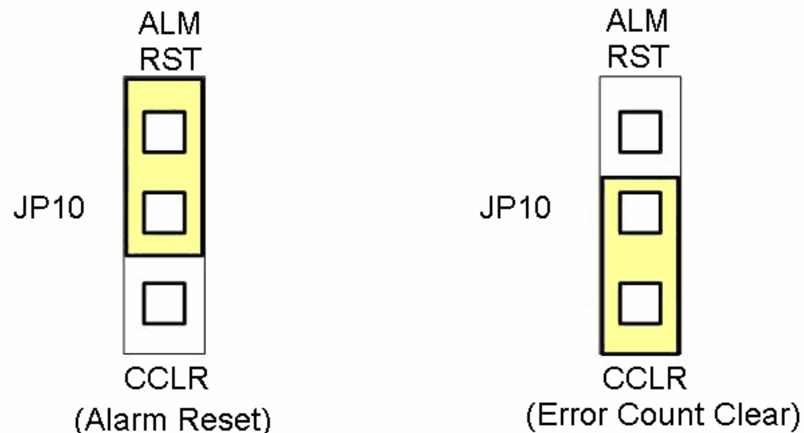


Fig. 3-15 JP 10 ~ 13 setting

B.5 DN-8468FB Daughter Board

The DN-8468FB is the daughter board for FUJI FALDIC-W Series Ampilifier. It has 4-axis I/O signals.

B.5.1 Board Layout for DN-8468FB

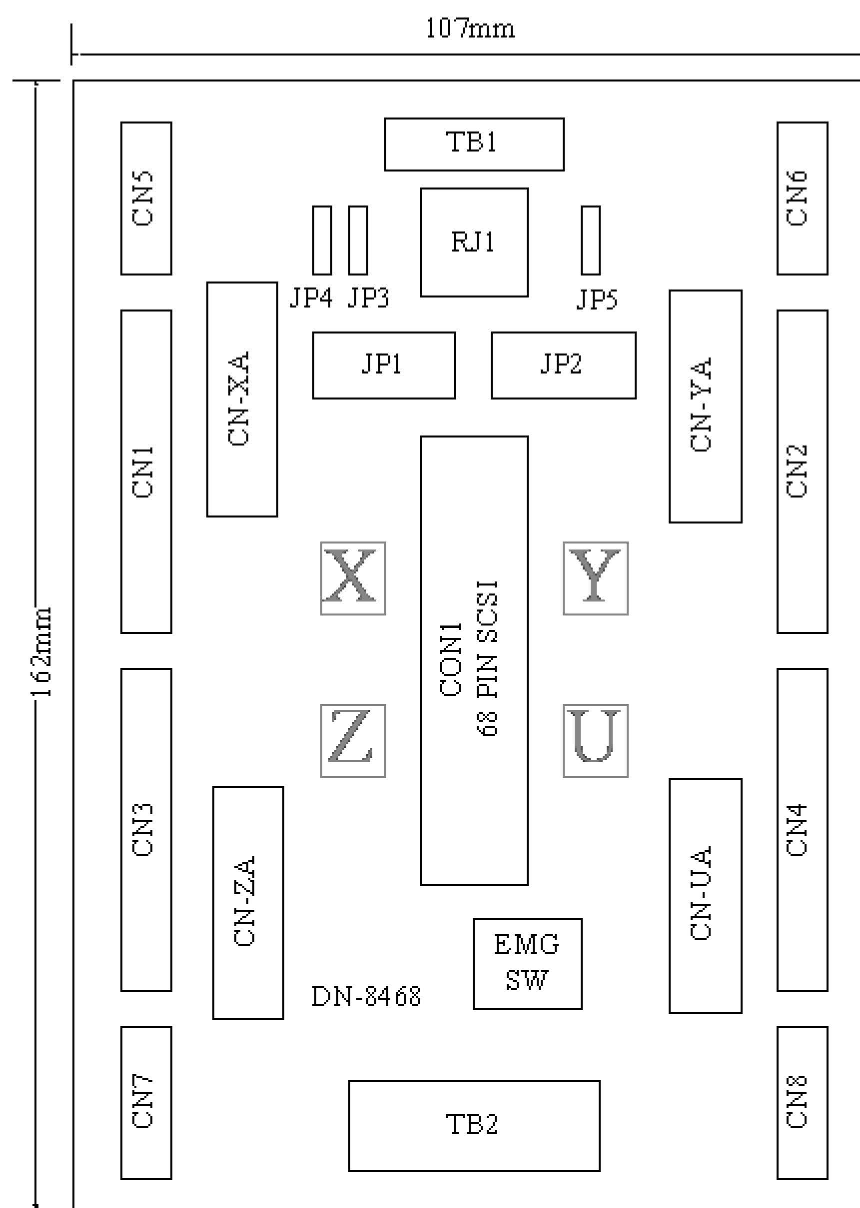


Fig. 3-1 Board layout for the DN-8468FB

B.5.2 Signal Connections for DN-8468FB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8468FB is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468FB (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

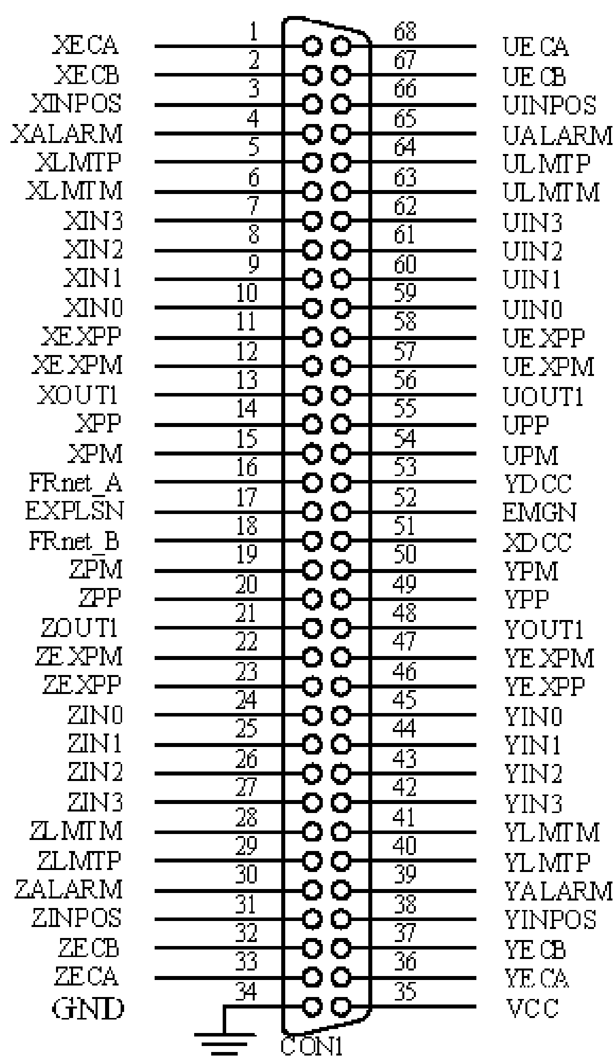


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 DN-8468FB I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

Table 3-3 DN-8468FB I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-3 shows the pin assignment for the 7-pin connector on the DN-8468FB, and the Table 3-4 shows its I/O connector signal description.

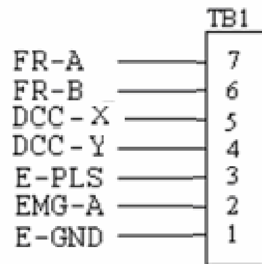


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.3-4 shows the pin assignment for the 5-pin connector on the DN-8468FB, and the Table 3-5 shows its I/O connector signal description.

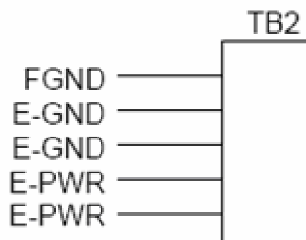


Fig. 1-4 Pin definition for TB2

Table 1-5 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-X, CN-Y, CN-Z, CN-U (CN1 connector for each AXIS in Driver)

The connectors CN-X, CN-Y, CN-Z, and CN-U are 26-pin connectors that enable you to connect to the CN1 connector of FUJI FALDIC-W series motor drivers. Fig.3-5 shows the pin assignment for the 26-pin connector on the DN-8468FB, and the Table 3-6 shows its I/O connector signal description.

Table 3-6 CN-X ,CN-Y ,CN-Z ,CN-U

Name	No.	Description
EXT_PWR	1	EXT POWER 24V
SVON	2	CONT1 of Servo Motor (default: SVON)
ALARM RESET	3	CONT2 of Servo Motor (default: ALARM RESET)
CONT3	4	CONT3 of Servo Motor
CONT4	5	CONT4 of Servo Motor
CONT5	6	CONT5 of Servo Motor
P+	7	Positive Direction Pulse (+)
P-	8	Positive Direction Pulse (-)
A+	9	Encoder A-phase (+)
A-	10	Encoder A-phase (-)
B+	11	Encoder B-phase (+)
B-	12	Encoder B-phase (-)
NC	13	No connection
EXT_GND	14	EXT POWER Ground
RDY	15	OUT1 of Servo Motor (default: RDY)
INPOS	16	OUT2 of Servo Motor (default: INPOS)
ALARM	17	OUT3 of Servo Motor (default: ALARM)
OUT4	18	OUT4 of Servo Motor
NC	19	No connection
N+	20	Negative Direction Pulse (+)
N-	21	Negative Direction Pulse (-)
NC	22	No connection
Z+	23	Encoder Z-phase (+)
Z-	24	Encoder Z-phase (-)
NC	25	No connection
NC	26	No connection

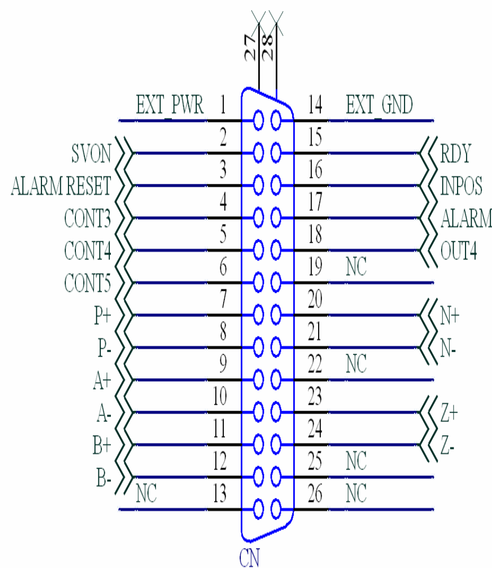


Fig 3-5 Pin definition for CN-X, CN-Y, CN-Z, CN-U

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3** : Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 12-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 12-pin connector on the DN-8468FB, and the Table 3-8 shows its I/O connector signal description.

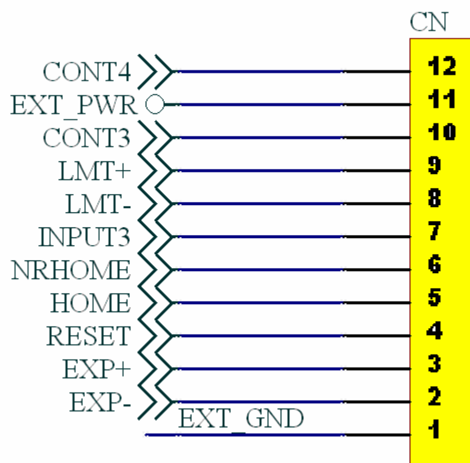


Fig 3-7 Pin definition for CN1~ CN4

Table 3-8 CN1~CN4

Name	Number	Description
CONT4	12	CONT4 of Servo Motor
EXT_PWR	11	EXT POWER 24V
CONT3	10	CONT3 of Servo Motor
LMT+	9	Limit switch Input Signal(+)
LMT-	8	Limit switch Input Signal(-)
INPUT3	7	Input Signal (IN3)
NRHOME	6	Near HOME Sensor Input Signal
HOME	5	HOME Sensor Input Signal
RESET	4	RESET Input Signal
EXP+	3	EXT Positive Direction Pulse(+)
EXP-	2	EXT Positive Direction Pulse(-)
EXT_GND	1	EXT POWER Ground

■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468FB, and the Table 3-9 shows its I/O connector signal description.

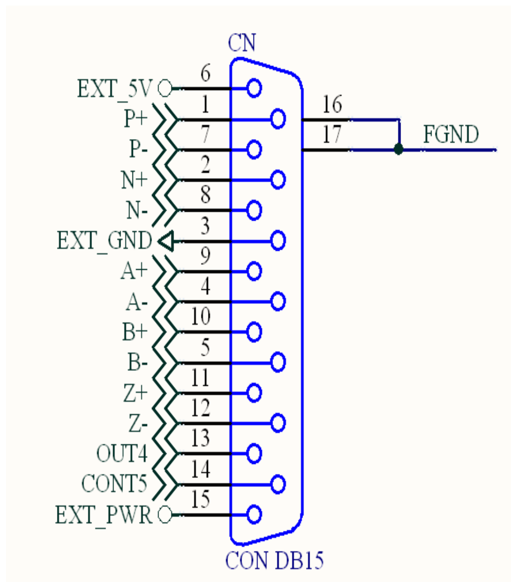


Fig 3-8 Pin definition for CN5~ CN8

Table 3-9 CN5~CN8

Name	Number	Description
P+	1	Positive Direction Pulse(+)
N+	2	Negative Direction Pulse(+)
EXT_GND	3	EXT POWER Ground
A-	4	Encoder A-phase(-)
B-	5	Encoder B-phase(-)
EXT_5V	6	EXT POWER 5V
P-	7	Positive Direction Pulse(-)
N-	8	Negative Direction Pulse(-)
A+	9	Encoder A-phase(+)
B+	10	Encoder B-phase(+)
Z+	11	Encoder Z-phase(+)
Z-	12	Encoder Z-phase(-)
OUT4	13	OUT4 of Servo Motor
CONT5	14	CONT5 of Servo Motor
EXT_PWR	15	EXT POWER 24V

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.3-9 shows the pin assignment for the 8-pin connector on the DN-8468FB, and the Table 3-10 shows its I/O connector signal description.

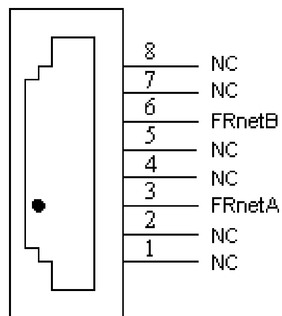


Fig. 3-9 Pin definition for RJ1

Table 3-10 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

Note: Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.5.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

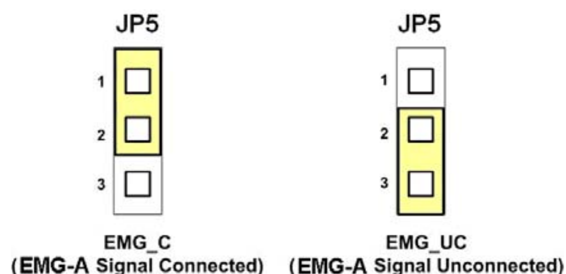


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

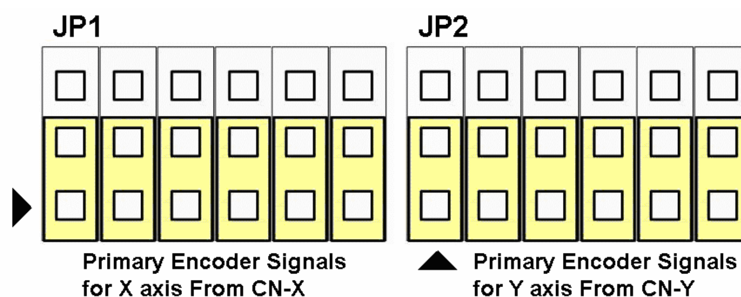


Fig. 3-11 Primary encoder signals setting

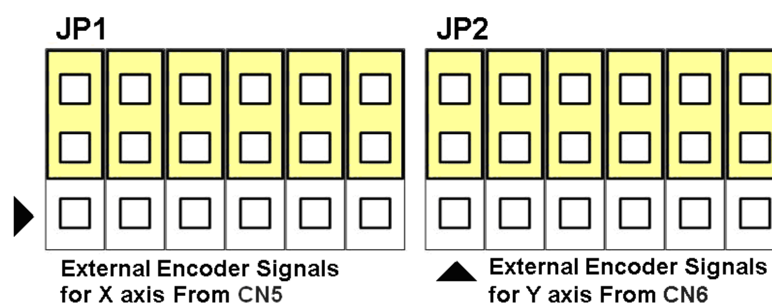


Fig. 3-12 External encoder signals setting

■ SW1

The CONT3 for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the CONT3 singals to GND. The CONT3 signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the CONT3 signals can be controlled from CONT3 signals in CN1 ~ CN4.

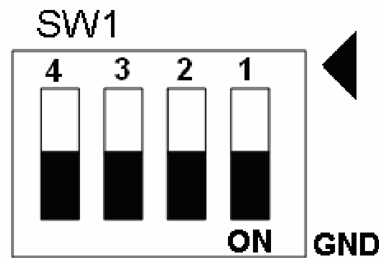


Fig. 3-13 SW1 setting for normally GND (Default setting)

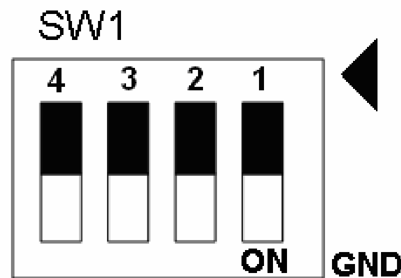


Fig. 3-14 SW1 setting for user controlled signals.